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Computer-Enhanced and Non-Computer-Enhanced Spanish Language Instruction: A Case Study

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Computer-Enhanced and Non-Computer-Enhanced Spanish Language Instruction: A Case Study

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Dedication

I dedicate this dissertation to my mother and father, with love.

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Computer-Enhanced and Non-Computer-Enhanced Spanish Language Instruction: A Case Study

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This investigation represents a case study of the implementation of technology in a university-level Spanish program. The study is both qualitative and quantitative in nature, and was conducted largely during the first phase of the implementation of a computer-enhanced component in the first-semester Spanish course at the University of Texas at Austin. The purpose was to observe what occurred in general, and specifically in two courses that were different iterations of the same first-semester Spanish curriculum: one version had a computer-enhanced component and the other did not. There were two research objectives: (1) to provide a historical perspective that describes the development of the computer-enhanced course; and (2) to describe learner progress in SLA with respect to one aspect of the target language—verb morphology. Three research questions guided the study: (1) What was the development of technology use in

this language program? (2) What effect, if any, does participation in computer-assisted verb exercises in the first-semester Spanish classes have on learners' ability to notice and focus attention on Spanish verb forms, thereby helping to learn the forms, as shown by accurate oral and written production? (3) What effect, if any, does participation in computer-assisted verb exercises have on learners' ability to use verb structures in oral production in terms of more self-initiated grammatical corrections but less overall fluency? The study examined one group of 50 Computer-Assisted learners and one group of 54 Classroom-Only learners, and considered both quantitative and qualitative data to describe the learners' oral and written verb production performance. Results of a pretest measurement (oral picture description, discrete-item verb test, and written composition) and a posttest measurement (final oral interview, discrete-item verb test, final written composition) are examined. Quantitative analysis of the posttest data showed a higher frequency of self-initiated grammatical corrections by the Computer-Assisted learners, but did not yield a significant statistical effect for the computer-assisted verb exercises on accurate oral and written verb production, except for the discrete-item verb test. Qualitative analysis of six sample transcriptions indicated between-group differences in learner speech with respect to pause frequency and distribution.

Table of Contents

List of Tables

CHAPTER ONE

Introduction

Computer technology has become an integral part of the teaching and learning process (Mitra, 2000). The use of computers has permeated education from the kindergarten level to post-graduate studies (Mitra, 2000), including the context of foreign language instruction (Chapelle, 2001).[1] Many university-level foreign language programs currently utilize computer technology in their curricula, and foreign language educators are seeking ways in which technology can enhance and improve how they do their job (Bush, 1997).

This dissertation presents a case study of the implementation of technology in a university-level Spanish program. The study was conducted during the beginning phase of the implementation of a computer-enhanced component in the first-semester Spanish course at the University of Texas at Austin. The study is qualitative and quantitative in nature, and describes what occurred in two courses that were different iterations of the same first-semester Spanish curriculum. Specifically, one version had a technology component and the other did not. In the computer-enhanced course, the learners (Computer-Assisted group) attended class with the instructor three days per week and participated in various computer-facilitated activities in a computer lab two days

[1] See Salaberry (2001) for a comprehensive review of studies in the area of technology-based instruction throughout the last century published in the *Modern Language Journal*.

per week. In the classroom-only course, the learners (Classroom-Only group) attended class with the instructor five days per week.

The present case study has two overall research objectives. The first is to provide a historical perspective that describes the conditions for the development of the two iterations of the first-semester Spanish course. The second research objective is to provide some perspective on learner progress in second language acquisition (SLA) with respect to one aspect of the target language: verb morphology. The study considers verb morphology because second language verb endings and tenses pose difficulties for most learners. Romance languages require verb inflection, which often imposes a heavy morphological burden on the learner that good computer exercises may alleviate (Blake, 1998). With respect to the second research objective, the present study observes and describes learners' verb production performance (oral, written, and self-corrected) in order to discover whether there are any differences in accuracy given that the Computer-Assisted group completes verb exercises in electronic format in the computer lab (computer-assisted verb exercises), and the Classroom-Only group completes written verb exercises in print-based format (traditional textbook and workbook activities).

During the first phase of technology implementation in this language program there was no indication in the course schedule catalog that some sections had a computer lab component. The only differentiation listed was for *true beginner* sections, which were limited to learners who had not studied Spanish at the secondary level. True beginner sections did not have the technology component, which learners did not know when they registered for the class.

Inclusion of a technology component in some sections made the curriculum different, even though all first-semester Spanish sections covered the same grammar and vocabulary. Therefore, the study compares learners who participated in the same first-semester Spanish course curriculum that was presented via the two different methodologies. Given two versions of the first-semester Spanish course, there are several differences between groups, of which the learning environment—classroom instruction with a technology component or exclusive classroom instruction—is perhaps the most apparent. Other group differences include: the degree of Spanish experience learners have, since the Classroom-Only group is comprised of mostly true beginners; the different formats of the oral pretest and oral posttest; and the amount of classroom interaction experienced by the learners. With regard to the latter, both groups participate in classroom interaction that includes instructor-facilitated activities and group- and pair-work. The Computer-Assisted learners, however, do not experience such interaction in the computer lab during the two days they attend class in the lab. The characteristics that differentiate the learners are further discussed in more detail in Chapter 3, Methodology of Data Collection and Analysis.

The aforementioned group differences illustrate that the learners are from two diverse subject populations, as opposed to a uniform random sample population, and thus cannot be compared by using a purely quantitative experimental design. The first-semester Spanish learners do share enough in common, however, to be compared by qualitative and descriptive means. Although much of the course material is presented via two methodologies, the

course content—the textbook, reading assignments, composition topics, grammar, and vocabulary—is the same for all of the learners. Hence, this research project is presented as a case study that utilizes qualitative and quantitative data to describe this particular experience. Quantitative data and statistical analysis are used to present a "snapshot" of verb production at the beginning and end of the semester, and to make observations and suggestions in which numbers are considered. Due to the previously discussed between-group differences, generalizations based upon results from the statistical analysis of the data cannot be made. Results from the statistical analysis are used to supplement the description of this particular study experience and this specific group of learners. The following sections provide a brief historical perspective of the implementation of computer technology in instructed second language acquisition and of the implementation of computer technology by the Spanish Department at the University of Texas at Austin.

COMPUTER TECHNOLOGY IN SECOND LANGUAGE ACQUISITION

The development of computer technology in the late 1960s and early 1970s, and the use of computers by linguists and literary researchers, paved the way for the introduction of computers in language teaching and learning (Ahmad, Corbett, Rogers, & Sussex, 1985). The use of computer technology to enhance learning is often referred to as computer-assisted instruction (CAI), or as computer-assisted language learning (CALL) when used in reference to enhancing foreign language learning and teaching. Early CAI entailed tutorials and drill and practice programs where the computer guided the user through a

prescribed course of learning and testing (Levy, 1997a). CAI has been defined more broadly as the use of a computer to assist instructional activities via such applications as drill and practice exercises, tutorials, simulations, and games (Merrill, Tolman, Christensen, Hammons, Vincent, & Reynolds, 1986). The term CALL also has been used to refer to use of a computer to assist in foreign or second language instruction; in other words, it indicates CAI applied to second language learning and acquisition (Merrill et al., 1986). According to Levy (1997a), the word *assisted* is significant because it highlights the role of the computer as auxiliary where its function is to be a part of the total learning experience. CALL also has been defined as "the search for and study of applications of the computer in language teaching and learning" (Levy, 1997a, p. 1). Underwood (1984) recognizes that CAI and CALL are often used interchangeably and uses CALL as the general term to cover all roles of the computer in language learning. In order to be consistent, the present study will use the term "CALL" to refer to the use of computers to aid the overall instructional process with respect to second language learning, except in instances where specific researchers use one term rather than the other.

Early CAI Programs

The use of computer technology in second language learning has its roots in the 1960s (Blake, 1998; Warschauer & Healey, 1998; Teichert, 1985). Computing in the 1960s referred to a mainframe system that consisted of a central processing unit (CPU), memory units, control panels, card readers, tape drives, line printers, and an air-conditioning system. This type of computer system

occupied an entire room and required its own staff (Blake, 1998; Jones, 1995). Progress in computer applications for education was slow because computer technology was dominated by science and business for many years (Jones, 1995). A breakthrough for CAI came with the introduction of PLATO (Programmed Logic for Automated Teaching Operations) at the University of Illinois (Jones, 1995). PLATO, the culmination of pilot projects conducted in the 1950s (Künzel, 1995), is the best-known mainframe project (Blake, 1998). PLATO used the time-share concept, in which a terminal was connected to a mainframe computer and each user paid for computer time (Teichert, 1985). Although applications for language teaching were not widely available to the average user (Jones, 1995), the PLATO project began by offering drill-and-practice exercises in Russian (Blake, 1998). In the 1970s, PLATO added lessons for all the principle languages being taught (Ahmad, et al., 1985). The use of a mainframe computer for the elementary programming required to provide drill-and-practice exercises was not economical, however, because PLATO was available only through expensive remote links. In addition to its high cost, other drawbacks to using PLATO included screens that could only display upper case letters, lack of foreign language characters, a small memory size of only 16K, and the use of a special cassette recorder as the only way to save a program (Jones, 1995).

About the same time that PLATO was being developed, the National Science Foundation (NSF) was funding another CAI project known as Time-shared Interactive Computer Controlled Information Television (TICCIT—Jones, 1995). TICCIT was designed by both computer technicians and educators. The MITRE Corporation began the work, and partnered with the University of Texas

at Austin and Brigham Young University as subcontractors. In 1972, UT-Austin and BYU formed a joint group called the Institute of Computer Uses in Education (ICUE). Members of the ICUE were instructional scientists and subject matter experts who designed the hardware and software with a team of technicians from MITRE, and eventually wrote Math and English courseware (Jones, 1995). TICCIT courseware did not take a learner through a series of linear steps, but rather allowed learners to move around in several directions. Learners could skip ahead, go back to review a concept, or ask for more detailed explanation. TICCIT was used outside of the classroom to instruct basic concepts and routine information. Students would then go to class prepared to discuss what they had learned (Jones, 1995).

A smaller group known as Computer Teaching Services was established at BYU when the NSF project ended. Development of TICCIT courseware then grew from the original remedial Math and English to include ESL, French, German, Italian, and Spanish (Jones, 1995). A German TICCIT program at BYU began in 1979 because many students had difficulty with some of the grammatical concepts. Instructors felt too much class time was spent talking about topics such as dative case, past tense, and subjunctive mood, and they wanted to devote more class time to communication activities. The idea was that participation in computer exercises that were completed in the TICCIT lab could take over a major portion of grammar instruction, thus allowing more class time for genuine language practice. In 1987, responsibility for TICCIT was transferred to the College of Humanities, at which point it was used for foreign language learning only (Jones, 1995).

Early learner-controlled CAI programs, such as those provided by TICCIT, were beneficial to students when used for grammar activities outside of the classroom. Learners could spend as much or as little time as necessary without having to wait or stop for those who needed more time to complete exercises or understand grammar explanations (Jones, 1995). There were also disadvantages associated with early CAI, including the high costs of hardware and programming, and the poor quality of many educational programs based upon behaviorism and its models of mechanized learning that the teaching profession had rejected (Künzel, 1995). The next breakthrough for CAI was the advent of the microcomputer in the late 1970s (Jones, 1995). In the early 1980s, the microcomputer put an end to the use of mainframes as a means of delivering language software (Blake, 1998).

Three Phases of CALL

Warschauer (1996a) categorizes CALL into three distinct phases: Behavioristic CALL, Communicative CALL, and Integrative CALL. Behavioristic CALL was based upon behavioristic theories of learning dominant in the 1960s (Warschauer & Healey, 1998; Warschauer, 1996a). Behavioral psychology viewed thought processes as a black box whereby one sees what goes into the box and what comes out, but cannot see the processes inside the box that convert input to output. Thus, learning is based upon observation and abstraction of input entering the brain and on the resulting output (Künzel, 1995). Programs from this phase of CALL involved repetitive language drills—drill and practice—for which the computer was used as a vehicle for delivering

instructional materials to learners (Warschauer, 1996a). Focus was on the program more than on the learner (Blake, 1998), and design of CALL materials during this phase was linear and teacher-driven (Garrett, 1987). Drill and practice exercises were based upon the premises of behaviorist learning theory that dictated that repeated exposure to the same material benefited learning. The computer was ideal for delivering repeated drills because machines did not become bored in presenting the same material over and over, and could present material on an individualized basis, allowing learners to work at their own pace and use class time for other activities (Warschauer, 1996a). The behaviorist learning paradigm seemed to work better for hard sciences, however, where CAI programs were used extensively (Blake, 1998). With respect to the study of foreign languages, use of CAI did not translate as well because it seemed that old content (i.e., workbooks) was "merely dressed in new technological clothes" (Blake, 1998, p. 212).

The second phase, Communicative CALL, was derived from the communicative approach to teaching prominent during the 1970s and 1980s (Warschauer & Healey, 1998; Warschauer, 1996a). Behaviorist learning theory with its drill and practice programs was seen as restrictive, not allowing enough authentic communication. Communicative CALL, like the communicative approach, focused more on using forms rather than on the forms themselves, taught grammar implicitly and not explicitly, allowed learners to create language instead of merely using prefabricated expressions, and employed the target language exclusively (Warschauer, 1996a). Communicative CALL corresponded to cognitive learning theory in that it emphasized learning as a process of

discovery and development (Warschauer & Healey, 1998). CALL programs used during this phase were more learner-driven (Garrett, 1987), and of a non-drill format such as courseware for paced reading, text reconstruction, and language games (Warschauer, 1996a). Communicative CALL seemed like a significant improvement over Behavioristic CALL; however, by the end of the 1980s many educators felt that it was not living up to its potential. Rather than contributing to central elements of the language teaching process, the computer was seen as marginal, used in an ad hoc and disconnected manner (Kenning & Kenning, 1990).

Integrative CALL developed from two important technological developments of the last decade—multimedia computer technology and the Internet. Multimedia technology includes text, graphics, sound, animation, and video, and also utilizes hypermedia that allows multimedia resources to be linked together, enabling learners to navigate their own path by pointing and clicking a mouse. There are many advantages to using hypermedia for language learning, such as the creation of a more authentic learning environment because listening is combined with seeing (Warschauer, 1996a), and the ability of hypermedia to address varying degrees of student ability (Blake, 1998). Language skills are easily integrated because the four skills—reading, writing, speaking, listening—can be combined into a single activity. Learners have more control over their learning and can proceed at their own pace or down their own individual path. A major advantage of hypermedia is that it facilitates focus on content or meaning without sacrificing a focus on language form or on learning strategies (Warschauer, 1996a).

While hypermedia has many advantages, there are also some significant problems, including the quality of available programs (Warschauer, 1996a). According to Warschauer, a more fundamental problem is that today's computer programs are not yet intelligent enough to be truly interactive, and probably will not be for some time. Multimedia technology as it exists today only partially contributes to Integrative CALL. Use of multimedia may involve an integration of skills such as listening and reading, but it does not always involve what Warschauer considers a more important type of integration—meaningful and authentic communication in all aspects of the language learning curriculum.

Furthermore, Burston (1993) points out that, despite the appeal of modern technological CALL applications, in whatever form, they must be judged on the basis of their pedagogical validity, on their ability to either perform old tasks better than traditional means, or on their ability to allow entirely new things to be done. Bailin (1988) emphasizes that, while a great deal of what a teacher does can be replicated by machine (e.g., CALL can check syntax and provide feedback to students in drill-and-practice exercises), the aforementioned approaches are a part of CALL, computer-*assisted* language learning, and should not be used in place of an instructor.

CALL and Cognitive Theories of Learning

Developments in CALL applications have been influenced by, but not based upon, cognitive theories of learning (Liddell, 1994). Cognitive psychology posits that in order to explain human cognitive capacities and learning patterns, it is necessary to understand inner mental states such as the storage and organization

of knowledge, and the generation of new knowledge (Künzel, 1995). Cognitive theory emphasizes manners in which the brain processes, selects, sorts, and categorizes raw information that it is eventually able to retrieve and use automatically or autonomously (Liddell, 1994). Language learning from the perspective of cognitive theory is considered a complex skill, involving use of various information-processing techniques, whereby learning takes place when learners are able to execute operations automatically or as a result of practice (Ellis, 1990; McLaughlin, et al., 1983; McLaughlin, 1978).

Cognitive theorists do not agree on how, or whether, cognitive learning is a continuum from raw, unanalyzed information to automatic, analyzed proficiency (Liddell, 1994). Further, the ability to analyze and recall analysis of language is independent of the ability to use it (Bialystok, 1988). Bialystok claims that explicit knowledge—what one knows about what one knows—is independent of implicit knowledge—what one can do without thinking about it. If Bialystok's claims are true, then they would help to explain how a learner can perform very well on discrete-item, analytical exercises such as drill-and-practice or fill-in-the-blank, but cannot always transfer those structural skills to a less-structured, free-flowing activity such as creative language use (Liddell, 1994).

Kenning and Kenning (1990) compared CALL exercises and concluded they have many parallels to cognitive theory. Several CALL exercises, for example, aim to help make language processing routine by emphasizing structure, pattern, and transfer. Such exercises include vocabulary learning, drill and practice, discrete-item exercises with context-sensitive feedback, and skill-oriented programs that attempt to develop reading or pronunciation skills

(Kenning & Kenning, 1990). It is important to remember that, while recent CALL exercises and software seem to correspond to the principles of cognitive theory in many respects, these exercises are not based upon theory nor are they supported by theory with any scientific evidence (Liddell, 1994).

CALL literature often discusses possible merits and defects of CALL; however, rarely are either founded upon any theoretical analysis (Swann, 1990). Implementation of CALL into the language learning classroom did not result from theoretical linguistics or psychological research. Detractors of CALL practices justify their opposition by alluding to a lack of unambiguous evidence that CALL facilitates greater learning than other methods of instruction (Dunkel, 1991). This lack of a clear-cut motive or stimulus from language learning research for introducing CALL into language learning programs has led to various forms of criticism directed at CALL (Bickes & Scott, 1989), including that CALL represents a return to behaviorism. That is, they claim it emphasizes grammar and not communication, CALL studies themselves have been criticized, and CALL's implementation lacks theoretical support from SLA research.

The majority of CALL applications have not been based upon any type of theoretical rationale, except for the theoretical framework built into basic CALL exercises, which is Programmed Learning from the behaviorist tradition (Salaberry, 1996). A common reaction against CALL in language teaching, therefore, is that it represents a return to behaviorist approaches (Fox, 1991; Swann, 1990; Bickes & Scott, 1989). In particular, drill and practice exercises are identified with behaviorism and Skinnerian conditioning (Swann, 1990). Swann points out, however, that even the simplest CALL drill has nothing to do with the

animal learning phenomena Skinner (1953) described. While a drill itself may be fairly simple, processes occurring in a learner's mind are not. Few serious psychologists today would reduce learners' behavior to Skinnerian terms (Swann, 1990). Further, the computer has come to be viewed more as a device to enhance learners' cognition rather than learners' ability to react on demand (Stevens, 1984).

Another criticism of CALL is that it does not meet the real needs of language learners because it emphasizes grammatical rather than communicative skills (Swann, 1990). Swann believes this claim is a reflection of the movement away from structure-based methodologies toward those that give prominence to communicative competence. Practitioners of the communicative language teaching approach believe CALL exercises reflect the flaws of older approaches to SLA (i.e., Audio-Lingual, Grammar Translation) that involved discrete linguistic items in isolation from meaning, error correction, record keeping, etc. (Swann, 1990). Ironically, according to Swann, these are the types of CALL exercises that have been the most effective with students. More recently, the computer has been considered as a facilitator, which is more in keeping with the communicative approach to language learning. Nevertheless, a major drawback to using CALL applications for enhancing second language learning remains: computers are not able to engage in spontaneous conversations and communicative drills are still an obstacle for CALL design (Salaberry, 1996).

While many studies investigating CALL effectiveness have been conducted, its acceptance by the language teaching profession is not yet universal (Glencross, 1993). Several researchers have criticized CALL studies that have attempted to investigate the pedagogical benefits of CALL for language learning.

Schmitt (1991) cites small sample sizes as a design flaw, and Reeves (1993) mentions a lack of any theoretical framework, along with small sample sizes and brevity of experimental treatments. Salaberry (1996) further points out that many empirical studies lack the use of a control group to measure increased learning as an outcome of the use of CALL applications.

There may not be any theoretical support for implementing CALL, but neither is there theoretical support not to do so. CALL is not grounded in any particular psycholinguistic theory of language learning, yet it is measured against various theoretical postulates with regard to language teaching, such as the idea that CALL should be communicative, interactive, and should aid in developing learners' communicative competence (Bickes & Scott, 1989). According to Liddell (1994), discussing CALL in relation to SLA methodology is problematic because methodology within SLA has yet to be defined with any degree of consensus. There is no commonly accepted theory in SLA that may be used as a basis for the production of CALL materials (Levy, 1997b). Levy further argues that proposed theories of CALL have been devised and validated in a non-CALL context under the assumption that a theory originating from outside a CALL environment can be effectively applied within it, which may not be the case.

Criticism of CALL fails to acknowledge that it may be used as a teaching tool just as more traditional media—such as teachers, textbooks, videos, blackboards, overhead projectors—are used in any comprehensive approach to language teaching (Bickes & Scott, 1989). Garrett (1989, p. 288) suggests that to ask whether technology in language learning actually works leads not to an

answer, but rather to further questions such as: What technology? What kind of learning? Under what circumstances?

It is important to make a crucial distinction in CALL research between the medium itself and an approach or methodology (Wyatt, 1987). The computer medium and use of computers in language learning are not tied to a particular type of pedagogy, method, approach, or philosophy; therefore, CALL should not be evaluated based upon its success as some kind of pedagogical principle (Garrett, 1991, 1989; Wyatt, 1987). Rather, use of the computer is better thought of as a medium or an environment in which to implement a variety of methods, approaches, or pedagogical philosophies (Garrett, 1991), one that has potential to be used as a component of a very wide range of different approaches and methodologies (Wyatt, 1987). Garrett (1991) further points out that computer materials and activities could be designed to support grammar drills, audiolingual drills, cognitive analysis of language, or any number of learning activities that make up a communicative syllabus.

How Could Computer Technology Be Utilized in SLA?

Garrett (1991) places the use of CALL within the framework of the four skills approach to language learning and teaching: speaking, listening, reading, and writing. Speaking has had great importance and priority in many language programs for some time. The computer, as Garrett points out, is far from ready to substitute for a human being in spontaneous authentic communication, but could be well implemented for listening skills. CALL exercises can provide textual support such as transcripts, glossary help, and structural clues. Implementation of

CALL in this manner is particularly valuable at more advanced levels of language learning where literacy and knowledge of formal language have a greater role in comprehension (Garrett, 1991). Use of the computer is also well suited to reading comprehension for which computer programs can highlight textual clues and use automatic timing to pace a learner through a text for various purposes. The writing skill is a natural activity for students to undertake in a CALL environment. According to Garrett, any exercises that require typing in the target language, even if they are only grammar or vocabulary drills, give some practice in writing.

CALL could be effectively utilized as a means of providing grammar instruction. Garrett (1987) suggests grammar instruction via CALL can use input enhancement techniques in order to show how language works (e.g., the role of inflections), to explain grammatical concepts, and to isolate and highlight particular language forms that could then be related to meaning. Current philosophy in language teaching requires a heavy emphasis on communication of meaning rather than on learning forms. Learning forms on the computer would free more class time in which to use those forms in oral communication and production.

Research into use of CALL applied to second language grammar instruction is fairly recent (Nagata, 1996). Although it is currently impossible for a computer to engage learners in authentic two-way communication, it is possible for CALL to provide integrated multimedia programs and to provide explicit grammar explanations (Nutta, 1998). Nagata's (1998, 1996) research indicates

that computer-based grammar instruction can be as effective or more effective than traditional instruction, such as workbooks and lectures.

Nutta (1998) found that learners in a computer-based group performed significantly better on open-ended tests than teacher-directed students. Nutta's results indicated that computer-based instruction can be an effective method of teaching target language grammar. Further, her results also indicated learners liked many of the features of computer-assisted instruction, including the ability to review the tutorial as much as they wished, the ability to proceed at their own learning pace, and availability of immediate feedback during the exercises. Because of the disadvantage of a small sample size, Nutta's results did not allow her to draw any definitive conclusions. Her study does, however, present evidence of meaningful differences between the computer-based and the teacher-directed groups' achievement scores on the open-ended tests she used. Nutta suggests that if open-ended tests measure learners' ability to use grammatical structures creatively, then perhaps some elements of computer-assisted instruction support the development of creative language use. It should be pointed out that not only was Nutta's sample size fairly small, but also the open-ended tests she used were written and not oral. Thus, any suggestions she makes based upon her results with regard to the development of creative language use apply to written, not oral, production.

CALL has many uses in SLA, which does not imply that it can or should do everything an instructor does. CALL is not designed to eliminate any other media traditionally used in second language teaching (e.g., textbook, classroom teaching, etc.), nor is it meant to be added as just a supplementary means of

learning (Bickes & Scott, 1989). CALL should be integrated into foreign language learning where computer exercises can have a variety of functions to include preparation of new material and reinforcement of work already covered during classroom time (Schulz, 1993).

There are several advantages to implementing CALL exercises in instructed foreign language learning, including immediate feedback, correction of predicted errors, and possibilities and opportunities for independent and individualized learning (Nutta, 1998; Glencross, 1993; Schulz, 1993; Bickes & Scott, 1989; Ahmad et al., 1985). Learners generally enjoy working on the computer (Nutta, 1998; Ahmad et al., 1985), which provides an environment in which they use the target language, receive individual tutoring, and make errors without pressure from classmates or the classroom (Blake, 1998; Nutta, 1998; Bickes & Scott, 1989). According to Blake, computer technology itself is advantageous because it does not have any particular methodology. The computer is a tool that can be used to strengthen any type of language learning in the classroom. Computer software, however, does involve instructional design or interface and therein reflects the particular pedagogy of its creator, just as any other textual teaching materials do (Blake, 1998).

A CALL environment supports some language activities very well, while others are not suited for this medium (Blake, 1998). For example, the computer functions well to provide linguistic and cultural support needed for reading authentic materials (Blake, 1998), and to expand vocabulary and overall language knowledge (Wright, 1992). Wright found that learners in a CALL group achieved better scores on vocabulary exams than the non-CALL group. The computer is

not well-suited for open-ended dialogue, nor does it represent a fully autonomous alternative to exposure to language through human contact (Blake, 1998).

Grammar exercises performed in a CALL environment offer the very practical advantage of providing immediate feedback to learners (Nutta, 1998; Garrett, 1987). Many teachers feel they should not spend much class time discussing grammar (Garrett, 1987). Garrett points out that while it is necessary and desirable to use class time for personal and group interaction and for spontaneous communication, there still exists the need to provide students with processing principles that will help them organize their learning, along with the means to practice those processing principles efficiently and individually in the absence of a teacher or tutor. Use of the computer has the advantage of providing that kind of information outside of class, as well as the ability to individualize instruction (Garrett, 1987). Due to the constraints of class time, class work does not provide opportunities needed for inductive learning; therefore, CALL may be able to assist learners to analyze target language forms via individual sequencing (Metcalfe, 1997). CALL exercises also have the ability to aid the synthesis or production of target language forms by anticipating which structures in particular may cause difficulties. Metcalfe further suggests CALL can provide the kind of explicit feedback learners need in order to notice when their output does not match target language forms, which is difficult to achieve using only implicit or positive evidence.

IMPLEMENTATION OF COMPUTER TECHNOLOGY BY THE SPANISH DEPARTMENT AT THE UNIVERSITY OF TEXAS AT AUSTIN

Historical Perspective

The University of Texas at Austin incorporated computer technology in its first-semester Spanish course in the Fall of 1996 as a partial solution to three long-standing, interrelated problems the Spanish department was facing: (1) Spanish was the most popular language on campus and demand for classes was increasing; (2) meeting the increased demand was straining institutional resources; and (3) graduate student instructors who teach the majority of lower-division Spanish courses had a very heavy workload between their teaching responsibilities and their own coursework (Sutherland-Meier, 1999). The Administration—the Dean of the College of Liberal Arts together with the Office of the Provost—was under pressure to cut the budget (Foerster, 1996), and was concerned about how to meet the increasing demand for lower-division Spanish courses without exhausting institutional resources (Sutherland-Meier, personal communication). The process of implementing computer-assisted instruction began in 1995 when faculty from the Spanish department (Professor Sutherland-Meier who was department chair, Professor Foerster who was coordinator of the lower-division program, and Professor Kelm who had developed several hypercard programs) consulted with both the Dean of the College of Liberal Arts and the Office of the Provost. All parties involved were determined to develop a solution to meet the challenges of increasing enrollment, demand for lower-division Spanish classes, and the heavy workload that graduate student instructors experienced (Sutherland-Meier).

The most expensive institutional resource is labor—graduate student instructors who receive a salary with benefits for teaching. The short-term solution for meeting the increasing demand for lower-division Spanish classes had been to keep hiring more instructors so that the Spanish department could continue to offer more classes (Sutherland-Meier, 1999). The department was offering over 138 sections of lower-division Spanish courses in order to accommodate the enrollment of more than 3300 students every semester and was employing 100 graduate student instructors (Foerster, 1996). Eventually, this practice was no longer economically feasible. Because of the budget constraints the University administration was facing, there was a need to find a way to reduce the number of instructors the Spanish department had to hire. The Spanish department was hiring one graduate student instructor to teach one five-hour class. If the department could create a situation in which one instructor taught two five-hour classes and was in the classroom three of those five hours, and the Spanish learners participated in two hours per week of computer lab activities, then the total contact hours for the instructor would be six rather than ten hours per week. Thus, the department could avoid hiring the large number of instructors it had traditionally employed (Kelm, personal communication).

A decision was reached whereby enrollment caps and computer technology for the first-semester Spanish course would provide a solution (Sutherland-Meier). Rather than continue to add more sections, the department limited enrollment and began the process of implementing technology in the first-semester course (Sutherland-Meier, 1999). Enrollment caps and implementation of a computer lab meant no instructor would lose a teaching position and the

department would not have to hire new instructors from other departments (Sutherland-Meier).

Design and Implementation of Computer-Enhanced First-Semester Spanish

A format was conceived in which the first-semester Spanish students would take a five-credit course that met five hours per week: three hours would take place in the classroom with an instructor and two hours would be spent in the computer lab. In this manner, one instructor would teach two five-hour courses but would actually meet with students in the classroom just three days per week (Foerster, 1996). The lower-division language coordinator's main objective with respect to the new format that implemented computer technology in the first-semester Spanish course was to maintain the pedagogical integrity of the program. The coordinator wanted to ensure that the quality of the program either remained the same or improved (Foerster, 1996). Under the new format, contact hours with the instructor were reduced from five hours to three hours per week, which meant that the manner in which classroom activities were conducted would change. Enrollment for the computer sections was therefore capped at 22 rather than 26 students so the instructor could spend more time with a smaller group, and could focus on using the target language during those three hours (Foerster, personal communication).

The Spanish department used funds from the instructional technology fee, which all students pay, to renovate a general-purpose classroom in Batts Hall (the building in which the department is currently located) into a computer lab for the first-semester course (Sutherland-Meier, 1999). To design the lab, the department

had to identify the activities that should be conducted in the lab as opposed to those that needed to remain in the classroom. A computer lab environment seemed conducive for such activities as grammar exercises, reading, listening, and quizzes. The purpose of the lab was not to diminish the role of the instructor, but rather to allow time for the types of activities the instructor does best (Kelm). The department wanted 50 workstations so that two sections of 25 students per section could attend at the same time. Once built, however, what was supposed to be a 50-workstation lab had only 30 workstations. The lab was reduced in size from the beginning because the computer equipment and sound partitions between stations took more space than initially anticipated. The solution for this logistical challenge was that some sections of first-semester Spanish would not have the lab component, which created computer-assisted sections in conjunction with classroom-only sections. The department had not planned to have such a division in its first semester course when it first developed the lab design (Kelm; Sutherland-Meier).

A team comprised of the language coordinator (Professor Foerster), the developer (Professor Kelm), and two media experts on the University of Texas at Austin staff created a new version of Spanish 506 (first-semester), which was piloted in seven sections in the fall semester of 1996. The new first-semester program consisted of two 50-minute sessions a week in the computer lab that included the following activities: Spanish Pronunciation Tutor, *Lecturas* (reading activities with a listening component and vocabulary exercises), Listening Comprehension (questions and sample answers from each chapter of the textbook to help students prepare for the oral exam), *Spanish Partner* (grammar exercises),

Communicative Goals Recordings (a graded oral production exercise), and written compositions. These activities are described in more detail in Chapter 3, Methodology of Data Collection and Analysis. Chapter quizzes, tests, and the midterm exam were also completed in the computer lab.

In the spring semester of 1997, the Spanish department offered 17 sections of the first-semester Spanish course with the computer lab component. At the end of the semester, several of the instructors commented that their students had performed very well on written assignments, including quizzes and exams, with regard to the production of accurate grammatical forms. One instructor further commented that she noticed a difference in her students' performance on the final oral interview in comparison to her experience in previous semesters teaching the first-semester course without the technology component. She had the impression that the Computer-Assisted learners sounded different but was not sure why she believed that. She thought perhaps the learners paused more often and that they seemed less fluent with respect to conversational flow. Instructor comments and anecdotes helped frame the research objectives and questions for the present case study, which was conducted during the third semester of the first phase of implementation—the fall semester of 1997. The two groups of learners who participated in the case study are described in detail in Chapter 3, Methodology of Data Collection and Analysis.

RESEARCH OBJECTIVES AND QUESTIONS

The present case study has two research objectives. The first objective is to provide a historical perspective that describes the conditions for the

development of the two iterations of the first-semester Spanish course. Given two versions of the same course curriculum, the second objective is to provide some perspective on learner progress that takes place in the two courses (Computer-Enhanced and Classroom-Only) regarding accurate verb production performance (oral, written, and self-corrections). With respect to the second objective, there are three research questions that guide this part of the case study:

(1) What was the development of technology use in this language program?

(2) What effect, if any, does participation in computer-assisted verb exercises in the first-semester Spanish classes have on learners' ability to notice and focus attention on Spanish verb forms, thereby helping to learn the forms, as shown by accurate oral and written production?

(3) What effect, if any, does participation in computer-assisted verb exercises have on learners' ability to use verb structures in oral production in terms of more self-initiated grammatical corrections but less overall fluency?

From the consideration of verb production, it is expected that there will be observable differences in performance and behavior given the previously discussed between-group differences and the two methodologies that take place in two learning environments. It is possible that the use of computer-assisted verb exercises will have a positive effect on the accuracy of Spanish verb form production because learners are frequently focused on specific verb structures in many of the computer exercises. Noticing target language forms should result in grammatical accuracy in the learners' output. It is also possible that such focus of attention on verb structures will have a negative effect on learners' fluency in oral production with respect to conversational flow. Because the two groups are not

statistically comparable, as previously discussed, we can only draw some inferences from the study results.

OVERVIEW OF THE CHAPTERS

This chapter introduced the objectives of this dissertation, and presented a short history of the introduction of computer technology in SLA, the beginnings of computer-assisted instruction (CAI) and computer-assisted language learning (CALL), cognitive learning theory with respect to CALL, and how and why computer technology was implemented by the Spanish department at the University of Texas at Austin. Chapter 2, Review of the Literature, presents the theoretical frameworks in SLA that are pertinent to the case study: traditional and communicative approaches in instructed second language learning, attention and noticing in SLA, the benefits of focus-on-form instruction as part of an overall communicative methodology, the difficulties encountered in second language verb learning, and target language fluency. Studies that are relevant to the present investigation are also discussed. Chapter 3, Methodology of Data Collection and Analysis, outlines methodology and data collection techniques, and describes the participants, the computer lab and classroom activities, the computer-assisted verb exercises, and how the data were scored for analysis. Chapter 4, Quantitative Analysis of Results, reports and discusses the statistical and quantitative results of the data analysis. Chapter 5, Conclusions, concludes the dissertation with a discussion and interpretation of the case study observations, and attempts to explain these findings. This chapter also acknowledges study limitations, and suggests possible directions for future research and investigation.

CHAPTER TWO

Review of the Literature

Second language instruction has evolved through many changes, from a traditional approach with explicit focus on language itself (e.g., grammar, phonology, and vocabulary), to a communicative approach with an emphasis on expression and comprehension of meaning through language (Lightbown & Spada, 1990). One of the questions the present case study attempts to answer is whether participation in computer-assisted verb exercises has any effect on the accuracy of learners' Spanish verb form production, because the computer-assisted verb activities focused learner attention on specific verb structures. Attention to and noticing of target language forms should result in greater grammatical accuracy in the learners' verb production. Hence, some of the issues in SLA that are pertinent to the study include instructed SLA, attention, noticing, focus-on-form instruction, and types of focus-on-form instruction. The present chapter discusses the aforementioned issues in SLA, relevant research that supports the benefits of focus-on-form instruction and their implications for second language learners, and the difficulties encountered in learning second language verb structures. The chapter concludes by addressing second language fluency with respect to instructed second language learning.

INSTRUCTED SECOND LANGUAGE ACQUISITION

Traditional second language instruction usually focuses on guiding learner output whereby an instructor explains a grammatical concept, then learners

practice producing given structures or forms (VanPatten & Cadierno, 1993a, 1993b). The traditional language classroom is constrained by traditional educational expectations, the dominance of teacher talk, and time. Further, the traditional foreign language classroom typically evokes an expectation of subject matter to be learned for which a teacher is in charge of directing the learning of that material (Doughty, 1998). Research on traditional language teaching indicates traditionally taught learners lack fluency, do not mentally represent their second language as explicit metalinguistic rules, do not learn what they are taught and, if they do, may or may not remember that material outside of the classroom. According to Doughty (1998), traditional language teaching isolates linguistic form, does not provide opportunities to develop fluency, ignores the existence and order of natural acquisition processes, and has not been an effective way to promote classroom language acquisition.

Communicative language teaching developed in response to the lack of success traditional language classrooms experienced, and as a way to overcome constraints on the traditional language teaching environment. Communicative language teaching attempts to provide conditions that are closer to those found in natural language acquisition environments. In attempting to bring the human experience of language learning into the classroom, communicative language teaching approaches are usually theme- and content-based, emulate immersion, and endeavor to provide students more opportunities to speak as opposed to the traditional dominance of teacher-talk. The communicative approach's emphasis on meaning led to more tolerance of errors in learner speech, and to the importance of creating opportunities for learners to use language in ways that were more

authentic and spontaneous than previous traditional approaches. The theory behind such pedagogical changes is that learners are able to develop greater communicative abilities in a second language through instruction that more closely resembles a natural acquisition environment (Lightbown & Spada, 1990). Communication must be the primary aim of foreign language instruction if comprehensible input and output, as well as fluency in the second language, are the goals of instruction (Doughty, 1998). As Doughty points out, however, does this aim mean that grammar and explicit linguistic forms should *not* be taught?

Grammar teaching became unpopular partly due to findings in psycholinguistics that second language learners follow similar stages in their acquisition of some grammatical properties, with or without instruction. Psycholinguistic studies also found that the stages of acquisition followed by second language learners were similar to those followed by children learning their first language. These findings, combined with results from SLA research that indicate learners do not always learn what they are taught and may be acquiring knowledge that is inaccurate or unnecessary, led to a general view that teaching grammar had little effect on the learning process (Doughty, 1998; Engel & Myles, 1996). This position has become less popular as the parallels drawn between first and second language acquisition have probably been overstated (Hawkins & Towell, 1996; Bley-Vroman, 1989). Furthermore, while the effect of instruction may be complex, it may not be negligible (Engel & Myles, 1996; Long, 1983). Doughty (1998) believes instruction should not be rejected on the basis of the failure of some traditional methods to promote language acquisition. Rather, she

suggests further consideration and examination of the extent to which linguistic form could be taught in a more effective manner.

Engel and Myles (1996) suggest the language teaching profession is caught between the success the communicative approach has had in motivating students and its perceived failure to produce learners who can use foreign language in a grammatically accurate manner. The communicative approach has had much more success than traditional grammar translation in promoting learners' ability to use foreign language in situationally relevant contexts. While these learners may not be able to conjugate verbs as accurately as learners of grammar translation methods, they are usually able to order food in a restaurant or ask for directions if lost. Second language instructors and learners both feel it is a positive development that learners are encouraged to communicate in the target language; however, both also feel that learners are not acquiring sufficient grammatical knowledge (Engel & Myles, 1996). Language students indeed may be more fluent due to the communicative approach than past learners, but teachers lament that the underlying grammatical knowledge learners are developing is far from that resembling native speakers' grammatical knowledge (Hawkins & Towell, 1996).

Learners themselves are asking for more grammar instruction in order to improve their grammatical accuracy (Engel & Myles, 1996). Adult second language learners generally want explanations and explicit terminology about the target language (Sharwood Smith, 1981). Sharwood Smith (1988) suggests that explanations might be appropriate because so-called natural methods simply take too long. Most students have a limited amount of time available to them;

therefore, by providing "some pattern or system in the target language, the teacher holds out a promise of ... a shorter and more effective way of mastering a structure" (Sharwood Smith, 1988, p. 52).

Grammar is an essential element in any act of communication that should be integrated into a communicative syllabus in order to show how the system works. It should not be presented in the form of lists of exceptions and bits of fragmentary knowledge (Engel & Myles, 1996). Evidence from SLA research suggests that instruction can facilitate learning (VanPatten & Cadierno, 1993b), and several studies have examined different approaches to teaching grammar (Fotos, 1993; Green & Hecht, 1992; Doughty, 1991; Ellis, 1993a, 1993b, 1985). Results from such studies indicate there are many ways to teach second language grammar and linguistic structures effectively, including some sort of attention to grammatical features and focus-on-form instruction. The following is a discussion that serves as an historical overview of attention in SLA, beginning with the issue of conscious versus unconscious processing.

CONSCIOUS AND UNCONSCIOUS PROCESSES IN SLA

Conscious versus unconscious processes have long been an issue in SLA with regard to whether learners need to attend to features in the input consciously in order to learn them, and whether learners need to be aware of what they are learning for learning to take place (Schmidt, 1994, 1990; VanPatten, 1994, 1989). According to Schmidt (1994, 1993a), issues of consciousness with respect to second language learning are evidenced by an abundance of terms such as *focus on form* versus *focus on forms* (Long, 1988), *consciousness-raising* (Sharwood

Smith, 1981), *input enhancement* (Sharwood Smith, 1993, 1991), and *input processing* (VanPatten & Cadierno, 1993a, 1993b). Robinson (1996a) suggests that much of the interest in the role of consciousness in second language learning has been prompted by critical reaction to Krashen's various "learning" versus "acquisition" theories (1985, 1982, 1981), including his Monitor Model (1982, 1979, 1977). Krashen claims that two distinct processes operate in second language development: a conscious process that uses the application of rules and is a learned system; and an unconscious process of induction that results in an acquired system. The acquired system is responsible for most language production since there are not many conditions under which the learned system can operate successfully. According to Krashen (1985, 1981), acquisition is largely unconscious whereas learning is conscious, and conscious knowledge of linguistic rules or forms is not necessary for acquisition, nor is instruction.

In contrast to Krashen's arguments for the role of unconscious processes in second language learning, there is support in the language teaching profession for an essential role for conscious processes and the belief that methodology should devise opportunities for learners to focus on form and to notice features of the target language consciously (Robinson, 1996a). Schmidt (1990) proposes the notion of consciousness is useful because it brings together related concepts such as attention, short term memory, and controlled versus automatic processing. Schmidt believes that conscious processing is a necessary condition for one step in the language learning process—noticing. Schmidt hypothesizes that deliberately paying attention to language forms is facilitative in all cases, and may

be necessary for the acquisition of redundant grammatical features by adult learners.

The term *conscious* with regard to SLA has come to be synonymous with explanation, grammar practice, drills, and knowledge of rules. Additionally, the term *unconscious* has come to be synonymous with input, communication, and communicative activities. This terminology is confounded because of popular terms such as explicit and implicit knowledge, explicit and implicit learning, and explicit and implicit teaching, where *explicit* has been equated with consciousness, grammar practice and knowing rules, and *implicit* has become equated with input and communication (VanPatten, 1994).

McLaughlin (1990a, 1990b) prefers to discuss language development in terms of the concepts of attention and control, rather than in terms of consciousness, pointing out several definitional problems with the use of *conscious* and *unconscious*. Consciousness is a difficult term to operationalize because different researchers mean different things when referring to it, and because the term is not used consistently from one context to another (Bialystok, 1994). Schmidt (1994, 1993a) proposes following the advice of McLaughlin (1990a, 1990b) to avoid using *conscious* and *unconscious* as undifferentiated umbrella terms since both have accumulated many conflicting meanings and such a range of partly distinct and partly overlapping definitions and uses is not helpful (Schmidt, 1995).

Schmidt (1995, 1994, 1993a, 1993b, 1990) questions the extent to which language learning results from unconscious processes. It is important to distinguish between *consciousness* as intentional behavior and *consciousness* as

awareness (Schmidt, 1990). In common everyday usage, consciousness is often associated with aims, plans, desires, and deliberateness (Schmidt, 1994, 1990). One might apologize for an offense by saying it was done unconsciously, meaning without intent (Schmidt, 1994). Schmidt (1995, 1990) points out that when we say we have done something consciously we often mean we did it deliberately, with intent and effort. In reference to SLA, Schmidt (1994, 1990) claims intentionality refers to whether a learner makes a deliberate decision to learn second language knowledge. Intentionality contrasts with incidental learning that takes place when learners gain second language knowledge through exposure. Schmidt argues that whether learning is intentional or incidental, it still involves attention to features in the input.

To say material is learned unconsciously may mean without attention or noticing (Schmidt, 1995). In applied linguistics, it has been commonly asserted that second language learning involves induction without awareness, and that learners know more than they can express (Schmidt, 1994). Cognitive scientists, however, argue that learning without awareness or attention is not possible (Schmidt, 1995, 1990). Schmidt (1995, 1994, 1993a, 1993b, 1990) argues that attention is necessary for noticing to occur, and that noticing is a necessary condition for language learning. Awareness is critical to noticing because that which is noticed is encoded in short-term memory and may then be encoded in long-term memory (Robinson, 1996a). The intention to learn is not always crucial to learning; however, attention to material—voluntarily or involuntarily—is necessary for learning to take place (Schmidt, 1993a).

ATTENTION IN SLA

Human beings are surrounded constantly by large amounts of sensory and cognitive information that human attention systems reduce and control (Tomlin & Villa, 1994). The amount of information the human mind can process at a given time is limited, therefore, attention is considered a limited capacity system (Schmidt, 1995; Harley, 1994; Tomlin & Villa, 1994; VanPatten, 1994, 1990, 1989; McLaughlin, Rossman, & McLeod, 1983). Attention is the process of selecting information for further processing and may be distributed among several tasks (Tomlin & Villa, 1994; Schmidt, 1992).

Second language learners may be overwhelmed by the amount of incoming target language *input*—the target language material to which they are exposed (Alanen, 1995; Tomlin & Villa, 1994). Not all input is available for language processing; therefore, *intake* is defined as the subset of the input learners actually perceive, notice, process, and incorporate into their developing knowledge system (Hegelheimer & Chapelle, 2000; Alanen, 1995; Schmidt, 1990; VanPatten, 1990, 1989). With respect to SLA, the claim has been made that attention to input is necessary for the conversion of input to intake that is then available for further processing (Schmidt, 1995, 1993a, 1993b, 1990; Tomlin & Villa, 1994; van Lier, 1994), and may involve going from controlled to automatic processes (Schmidt, 1992).

Controlled and Automatic Processing

Schmidt (1992) proposes development of skilled behavior, including second language learning, involves a shift from controlled to automatic

processing. Controlled processing is slow, inefficient, effortful, limited by short-term memory capacity, mostly under subject control, flexible, and at least partly accessible to introspection. Controlled processes maintain goals in working memory, apply general procedures to new circumstances, and usually occur in new and inconsistent processing tasks. Conversely, automatic processing is fast, efficient, effortless, not limited by short-term memory capacity, not under voluntary control, difficult to modify, and unavailable for introspection. Automatic processes are responsible for skilled performance and well-practiced tasks. Only a limited number of features can be controlled at one time without interference occurring because controlled processing requires active attention, whereas automatic processing takes place without active control or attention (Schmidt, 1992).

Certain skills and mental activities seem to require more attention than others, thus attentional resources are freed to perform other tasks once a task becomes automatized (Tomlin & Villa, 1994; Schmidt, 1992). If second language learning does involve a shift from controlled to automatic processing, as Schmidt (1992) suggests, that could explain why beginning second language learners must pay careful attention to every step in the procedure while advanced learners may not. Grammar development does not take place without selective attention by which learners must notice, at some level, a mismatch between the input to which they are exposed and their own organization of the target language (Gass, 1988). In order for some learning to occur, learners' attention must be constantly engaged (Garrett, 1987). Further, noticing brought about by feedback, task structure, or other means is necessary for input to become intake (Long, 1990).

Noticing

Tomlin and Villa (1994) suggest learners use attention to help sort input in one of two ways: as an aid to comprehending the meaning of an utterance, which is attention to meaning, and as an aid in psycholinguistic processing of the components of an utterance, which is attention to form. Learners, at least the highly literate learners who are usually the subjects in SLA studies, resort to the use of attention as an aid to processing the second language (Salaberry, 1996). Salaberry bases his assumption upon Schmidt and Frota's (1986) study in which Schmidt kept a diary while learning Portuguese in Brazil. Based on his own experiences, Schmidt acknowledged it is difficult for adult second language learners to achieve any degree of success in learning a foreign language unless they resort to active processing, or *noticing*, of features in the second language system. Schmidt (1995, 1994, 1993a, 1993b, 1990) therefore argues that noticing is necessary for second language learning. Specifically, "...noticing is the necessary and sufficient condition for the conversion of input to intake for learning" (Schmidt, 1994, p. 17). Schmidt concedes that whether noticing is a conscious event is controversial; therefore, he proposes noticing is "...operationally defined as availability for verbal report" (Schmidt, 1990, p. 132). The lack of verbal report, however, cannot be interpreted as failure to notice unless such a report is collected either concurrently or immediately following an experience. One must also realize that there are some experiences that are difficult to describe, but that does not mean they were not noticed. For example, one may notice two wines taste different but cannot describe what that difference is

(Schmidt, 1990). Tomlin and Villa (1994) consider attention as the process of selecting information for further processing; whereas, Schmidt (1995, 1994, 1993a, 1993b, 1990) considers noticing to be actively processing information upon which one focuses attention.

In order to support his argument that noticing is necessary for second language learning, Schmidt (1995, 1993a, 1993b) proposes the Noticing Hypothesis that states that features learners notice in the input then become intake for learning. Schmidt (1995) claims that learning requires awareness "at the time of learning" (p. 26). The Noticing Hypothesis stipulates that input must be noticed in both a global and narrow sense whereby specific features of input relevant to the target system are also included in what learners notice (Schmidt, 1993a, 1993b). For example, in order to acquire phonology learners must notice and attend to phonology; in order to acquire pragmatics learners must notice both linguistic forms and contextual features (Schmidt, 1993a). Schmidt (1994) further suggests that rather than attempt to determine the zero-point for acquisition, it would be better to test the hypothesis that more noticing leads to more learning.

Attention and noticing have an important role in SLA because, according to Bialystok (1994), noticing forms in the input permits the changing of mental representations, which then facilitates more advanced proficiency. When learners pay attention to forms, they begin to notice gaps between what they produce and what a native speaker produces. Noticing these gaps leads to further awareness, which leads to more knowledge and the possibility of changing erroneous mental representations (Bialystok, 1994). Attention in SLA raises a theoretical question that has been the basis of debate in the field: Can learning occur without *active*

attention and noticing on the part of the learner? In other words, is second language learning implicit or explicit?

The Implicit / Explicit Issue

Implicit learning is considered to be the acquisition of knowledge without the intent to learn (Robinson, 1996a, 1995a), and without awareness or the formulation of any rules at the level of understanding (Schmidt, 1995; DeKeyser, 1994). Schmidt (1995) considers explicit learning to be learning based upon knowledge of which the learner is aware. Rules are formulated either by the instructor or by the learners who intentionally search for and apply those rules to the input (Robinson, 1995a; DeKeyser, 1994). Explicit learning does not mean that learners must be given sets of grammatical rules, but rather that learners take an active role in the process of creating and testing hypotheses about the nature of the structures found in the input (Schmidt, 1995; N. Ellis, 1993).

Research in cognitive psychology seeks to demonstrate the existence of implicit learning. Conversely, research in SLA over the past two decades has attempted to document how unsuccessful explicit learning and teaching of a second language can be (DeKeyser, 1994). There is very little empirical evidence that supports implicit learning in either cognitive psychology or applied linguistics research (Doughty & Williams, 1998a; DeKeyser, 1994). DeKeyser therefore finds it surprising that in the field of applied linguistics the burden of proof currently seems to be on those researchers who claim that explicit learning is possible. On the other hand, cognitive psychologists are attempting to find empirical evidence for the superiority of implicit learning. There has been little

research that demonstrates the success of implicit learning at the level of morphosyntactic proficiency (Alanen, 1995). According to Alanen, the effectiveness of implicit learning remains controversial.

Explicit grammar instruction in the foreign language classroom has been the subject of debate in recent years (Leeman, Arteagoitia, Fridman, & Doughty, 1995; Fotos & Ellis, 1991). Hulstijn (1995) argues that explicit instruction of grammatical forms facilitates the acquisition of a second language. Classroom studies of second language learning support his argument, because findings thus far indicate focus-on-form instruction can be advantageous. For example, DeKeyser (1994) and Robinson (1995a, 1995b) found that such instruction leads to significantly greater short-term learning than pure meaning-focused instruction for the target language rules they investigated. Williams and Evans (1998) found positive effects for focus-on-form instruction with respect to the accurate use of participial adjectives. Explicit grammar instruction may not be able to alter the sequences of development, but it does appear to offer some advantages over either naturalistic SLA or classroom instruction without a focus on form (Long, 1991). According to Long (1991, 1983), instruction with a focus on form speeds up the rate of learning, affects the processes of acquisition in ways that are beneficial to long-term accuracy, and appears to raise the ultimate level of attainment.

The issue of implicit learning versus explicit learning is often investigated in the context of instructed second language acquisition in terms of whether it is possible to teach grammar rules to second language learners (Schmidt, 1993a). Those who support the implicit learning position maintain that there is no role for explicit grammar instruction in SLA, because development of competence in the

target language must follow its own course that cannot be affected by grammar teaching (Ellis, 1985; Krashen, 1982). Learners, it is argued, are able to acquire new second language knowledge as a result of participating in communication via meaning-focused instruction (Ellis, 1990).

Meaning-focused instruction consists of classroom activities that encourage learners to communicate using linguistic and non-linguistic resources (Ellis, 1990). The learner is engaged in communication in which the primary effort is to exchange meaning; there is no intentional attempt to achieve grammatical correctness (Ellis, 1990). Meaning-focused instruction also provides learners with the opportunity to communicate in order to develop fluency (Ellis, 1990). Although communicative meaning-focused instruction is essential, not all second language features can be acquired when learners' attention is focused exclusively on meaning without some attention to grammatical forms (Schmidt, 1995).

FOCUS-ON-FORM INSTRUCTION IN SLA

In reaction to claims that second language development is a mostly unconscious process, many theoretical arguments have been proposed by several researchers in support of a role for attention, noticing, and focus on form in second language learning (Ellis, 1995, 1993a, 1993b, 1990; Schmidt, 1995, 1994, 1993a, 1993b, 1990; Sharwood Smith, 1993, 1981; Long, 1991). Focus-on-form instruction in SLA involves such issues as attention, noticing, and accurate oral and written production. Attention has an important role in SLA because, in order for learners to acquire and use target language forms, they must first notice the

forms and be able to focus attention on them (Schmidt, 1995, 1994, 1993a, 1993b, 1990; Bialystok, 1994; Tomlin & Villa, 1994; VanPatten, 1989). Instruction that directs learners to focus on form is one means of helping learners notice particular linguistic features in the target language. If learners focus attention on forms, and thereby notice and learn those forms, their oral and written production could benefit in terms of greater accuracy.

Focus-on-form instruction engages learners in activities that teach specific grammatical properties and encourages learners to reflect on the formal features of the language (Ellis, 1990). According to Ellis, focus-on-form instruction can lead to enhanced accuracy, help learners progress through developmental stages more rapidly, and destabilize interlanguage grammars that have fossilized. Harley (1993) suggests focus-on-form instruction can draw learners' attention to grammatical structures that are not obviously different from their first language (e.g., adverb placement in French and English). She further suggests explicit instruction is beneficial for learning forms that are not salient because they are irregular or infrequent in the input (e.g., conditionals in French), as well as for forms that are not important for successful communication (e.g., third person singular -s in English). Grammatical structures that tend to be difficult for learners are those that are neither perceptually salient nor communicatively necessary, and therefore are often less accurate in the interlanguage production of advanced learners (Doughty, 1998). Furthermore, several recent studies have investigated the effects of language teaching design features that attempt to manipulate noticing in second language learning (Alanen, 1995; Jourdenais, Ota, Stauffer, Boyson, & Doughty, 1995; Leeman, et al., 1995; VanPatten & Cadierno, 1993a,

1993b; Doughty, 1991; Fotos & Ellis, 1991). How to focus attention on linguistic form, how much attention, and on which forms, is currently the subject of much debate (Doughty, 1998; Robinson, 1996a).

Many instructional methods make the assumption that focusing learner attention on linguistic form aids acquisition of grammatical knowledge and helps learners internalize target language rules (Ellis, 1985). O'Malley and Chamot (1990) assert that teachers can assist the learning process by using "academic" language because language learning involves several cognitive decisions. These researchers express concern regarding some prevailing views of second language acquisition that ignore deliberate cognitive processing and claim acquisition occurs without awareness, thereby viewing language instructors' primary role as providers of input. Language comprises both form and function; therefore, to be more fully competent in a second language, learners must acquire form, function, and meaning (Doughty, 1998). Doughty suggests focus-on-form tasks and techniques should attempt to engage learner attention in order to facilitate the effective noticing of form-function relationships.

Second language classroom research has begun to indicate that some sort of focus on form is useful to some extent, for some learners, for some forms, at some point in the learning process, and may be necessary in order to push learners beyond communicatively effective language toward more target-like ability (DeKeyser, 1998, 1995; Doughty, 1998, 1991; Doughty & Williams, 1998b; Robinson, 1996b; N. Ellis, 1993; Spada & Lightbown, 1993; VanPatten & Cadierno, 1993a, 1993b). While focus on form may not be absolutely necessary, it could be part of a more efficient language learning experience that may accelerate

natural language acquisition processes (Doughty & Williams, 1998b). Recent studies further indicate that instruction including some focus on form can be more effective than instruction that does not include it (Harley, 1993; Doughty, 1991; Lightbown & Spada, 1990). Increased noticing of some kind is beneficial to learners, so if input can be manipulated in a manner that draws learners' attention to specific forms, one would expect it to facilitate the learning of those forms (Leeman et al., 1995).

As learners hear and comprehend language, perceived input is held very briefly in limited-capacity short-term memory and can be replaced by the next wave of incoming input unless attention is engaged so further mental processing can occur (Doughty & Williams, 1998a). Further processing has been described as the stage of going from input to intake (VanPatten, 1994; Gass, 1988). Intake undergoes additional mental processing, enabling the learner to encode linguistic material into long-term memory. According to both Gass and VanPatten, input that is not converted to intake is lost and thus no longer available for any subsequent language acquisition processes. The important pedagogical issue is not just whether learners pay attention to form, but also includes how to increase allocation of attention because the more one pays attention, the more one learns (Doughty & Williams, 1998a).

Focus on Form versus Focus on FormS

Long (1991; Long & Robinson, 1998) introduced the term *focus on form* as a way of describing instruction that induces learners to attend to form within a meaningful communicative context. Focus on form refers to how attentional

resources are allocated (Long & Robinson, 1998). Long specifically contrasts this concept with traditional grammar instruction; in other words, *focus on form* is not the same as *focus on formS* whereby forms are taught exclusively or in isolation from meaning. According to Long (1991, pp. 45-46), "...focus on form...overtly draws students' attention to linguistic elements as they arise incidentally in lessons whose overriding focus is on meaning or communication." Long and Robinson (1998, p. 23) further propose that "...focus on form often consists of an occasional shift of attention to linguistic code features—by the teacher and/or one or more students—triggered by perceived problems with comprehension or production." Long and Robinson point out there are degrees of attention, and attention to form and attention to meaning are not necessarily mutually exclusive.

Focus on form precisely draws learners' attention to a linguistic feature of the target language when necessary in order to facilitate communication (Doughty & Williams, 1998b). Doughty and Williams believe focus on form and focus on formS are not polar opposites in the way form and meaning are often considered. Focus on form involves focusing on formal elements of language, whereas focus on formS is limited to such a focus. The fundamental assumption of focus-on-form instruction is that meaning and use must already be evident to learners at the time attention is given to the linguistic form needed to express meaning (Doughty & Williams, 1998b).

In focus-on-form instruction, learners pay attention to form while their instructor attempts to set up conditions for such a focus (Jourdenais et al., 1995). Attention to form is always integrated with attention to meaning, which is still central to the lesson, and attempts to draw students' attention to specific formal

features of the target language. Teachers, materials designers, and researchers can only provide conditions in which learners attend to form; thus, learners, not teachers, assume the active role (Leeman et al., 1995).

Focus on form is one manner in which instruction is made useful, and does not imply a return to a grammar translation methodology. Rather, explicit teaching and systematic practicing of certain forms may be beneficial for some learners (DeKeyser, 1998). Nor does focus-on-form instruction imply learners must be able to state rules explicitly; instead, it is a method of attempting to focus attention on particular second language structural properties (Metcalfe, 1997).

Rationale to Include Focus-on-Form Instruction in SLA

The assumption that the noticing of target language features to be learned is necessary in order for second language acquisition to occur is one rationale for implementing focus-on-form instruction (Jourdenais et al., 1995). Another rationale for including focus on form in second language teaching is motivated, at least in part, by results from immersion studies that indicate that purely meaning-focused second language learning does not develop some linguistic features to target-like levels and, in some cases, does not develop certain features at all (Doughty & Williams, 1998b; Harley, 1992; Harley & Swain, 1984). Therefore, a complete lack of attention to linguistic form may not be in the best interest of the learners (Doughty, 1998).

Immersion studies provide evidence that communicative language teaching does not necessarily lead to grammatical accuracy. Children in Canadian French immersion programs attend classes from kindergarten through high school

in which all instruction during the first years, and much of it in later years, is delivered in the target language French (Jourdenais et al., 1995). Thus, immersion students receive large amounts of comprehensible input in a communicative setting and should, according to Krashen (1985, 1982, 1981), achieve high degrees of fluency and comprehension of the target language as a result. Immersion classrooms do indeed provide an environment in which the context for language learning is rich, and in which learners are exposed to years of meaningful input and opportunities for interaction. Immersion learners, however, do not acquire full native-like abilities (Doughty, 1998; Doughty & Williams, 1998b). Children in these immersion programs learn to speak French fluently and confidently, but their accuracy with respect to French syntax and morphology is still far below what one might expect given these learners have spent several years immersed in the second language (Swain, 1998, 1985; Lightbown & Spada, 1990; Harley & Swain, 1984).

One possible explanation for this phenomenon is that, although these learners have many opportunities to produce language, they may experience only a limited number of opportunities to produce language that goes beyond simply getting their message across (Swain, 1993, 1985). Results from immersion studies have led language instructors to raise the question of how systematic treatment of formal properties of language can be incorporated into a communicative approach to language teaching (Jourdenais et al., 1995). Many learners need to focus on form in order to achieve accuracy, especially adults (Celce-Murcia, 1991; Schmidt, 1990). There is no empirical evidence that communicative classrooms produce better learners; however, there is some evidence from the French

Canadian immersion studies that a grammarless approach "...can lead to the development of a broken, ungrammatical, pidginized form of the target language beyond which students rarely progress" (Celce-Murcia, 1991, p. 462).

Classroom second language learners and instructors face a dilemma: emphasizing communication produces learners with higher degrees of fluency as far as their ability to speak with confidence and few hesitations, while disregarding attention to form prevents learners from becoming accurate and precise speakers. Emphasis on communication may not provide enough exposure to grammatical structures such as verb endings and tenses, which may be necessary for adult second language learning. Metcalfe (1997) hypothesizes that, with the advent of the communicative approach, today's second language learners may often receive items of realia that do not contain many verbs. Learners might be able to produce written verb forms accurately in isolation, but may not be able to transfer that ability to an integrative task such as spontaneous conversation (Stokes, 1985). Therefore, second language teaching must find a way both to expand ability to communicate and to improve accuracy (Doughty, 1998). Grammar and linguistic forms should not be taught alone, but rather in relation to form, meaning, and function in order to become part of communicative competence (Metcalfe, 1997).

Methods of Focus-on-Form Instruction

Doughty (1998) and Doughty and Williams (1998a) advocate complementing communicative instruction with a component designed to improve formal accuracy by drawing learners' attention to specific features of the target

language. Schmidt (1995, 1993a, 1993b, 1990; Schmidt & Frota, 1986) has claimed that awareness of linguistic form in the input at the level of noticing is a necessary condition for language learning to occur. Schmidt suggests that when learners notice a feature in subsequent communicative input, acquisition of that feature may take place. While techniques that might accomplish noticing and attention to form are varied, there is a common rejection of the claim that exposure to comprehensible input is all that is necessary for second language acquisition to occur. Learners must attend to formal aspects of a target language if they are to restructure their own interlanguage system (Sharwood Smith, 1993; VanPatten, 1989). Methods that encourage learners to focus on form include consciousness-raising, input enhancement, and explicit grammar instruction; however, it remains to be determined which methods are the most effective (Doughty, 1998).

Consciousness-Raising

Several SLA researchers have argued for a role for consciousness-raising in formal second language instruction as an activity to develop learner awareness of grammatical features (Ellis, 1993a, 1993b, 1990; Fotos & Ellis, 1991; Rutherford & Sharwood Smith, 1988; Sharwood Smith, 1981). Consciousness-raising is a type of focus-on-form instruction designed to increase noticing of specific linguistic features. It deliberately attempts to draw learners' attention to formal properties of the target language in order to facilitate development of second language knowledge (Ellis, 1997, 1990; Sharwood Smith, 1991, 1981; Rutherford & Sharwood Smith, 1988, 1985). Not to be confused with grammar-

translation, consciousness-raising treats form-focused instruction as a means to the attainment of grammatical competence, not as an attempt to instill it, and recognizes that learners can contribute and shape the process of acquisition. Consciousness-raising may be accomplished without requiring learners to verbalize any rules they learn or to talk metalinguistically about anything of which they have become aware (Ellis, 1990, 1985; Sharwood Smith, 1981).

Consciousness-raising is not one method, but rather a continuum of strategies that may involve the use of typographical conventions such as underlining, capitalizing, or highlighting specific grammatical features and then asking learners to pay attention to anything underlined, capitalized, or highlighted. *Input flooding*, a flood of positive evidence that deliberately exposes learners to a high frequency of a particular target structure in the input, is another method that may attract learners' attention to specific formal features of the second language (Rutherford & Sharwood Smith, 1988, 1985). *Positive evidence*, or input that shows learners what is grammatical but not what is ungrammatical, and *negative evidence*, or information given to learners either directly or indirectly that lets them know an interlanguage hypothesis is incorrect, are also considered consciousness-raising techniques (Ellis, 1997).

Rutherford and Sharwood Smith (1988) emphasize that consciousness-raising does not automatically ensure learners will either notice or acquire a structure or feature of the target language. Consciousness-raising is not intended to be an alternative to communicative language teaching, nor a substitute for the achievement of communicative skills. Rather, consciousness-raising should be viewed as one part of a larger pedagogical context in which it acts as a potential

facilitator for learning some grammatical features of the target language, and for acquisition of linguistic competence (Rutherford & Sharwood Smith, 1988, 1985).

Input Enhancement

Consciousness-raising is a misleading term because it brings up the issue of exactly what is meant by *consciousness*; therefore, consciousness-raising has been reconstructed as *input enhancement* by Sharwood Smith (1993, 1991). According to Sharwood Smith, it is not appropriate to assume external manipulation of input is the process that will increase learners' attention; thus, he coined the term *input enhancement* to replace consciousness-raising because this new term focuses on manipulation of linguistic material rather than on learners' internal processes. In other words, input enhancement involves making input more salient to learners whereby instructors attempt to increase accessibility to target language grammar. Input enhancement makes no assumptions about what has happened to the learner, but rather better describes actions of the teacher by focusing on observable characteristics of input and less on learners' internal processes (Metcalfe, 1997; Sharwood Smith, 1993).

Several researchers advocate a role for input enhancement to direct learner attention to linguistic form (Ellis, 1995; Sharwood Smith, 1993, 1991; Doughty, 1991; White, Spada, Lightbown, & Ranta, 1991), which may be accomplished externally by foreign language instructors or internally via a deliberate effort on the learners' part. Sharwood Smith (1993) proposes several types of enhanced input that may focus learners' attention on form, including explicit discussion of linguistic form, implicit error correction through use of special patterns of stress

or intonation, gestures, or facial expressions, negative evidence through overt error correction, textual enhancement such as highlighting and color, and input flooding in which learners are exposed to a large number of target language examples. The latter, more implicit option, may be less disruptive to meaning-based activities, but may not be sufficient to encourage learners to notice linguistic forms in the input or to notice a gap between target language structures and their own interlanguage. Therefore, more direct instruction that provides negative evidence may be more appropriate in some cases (Williams & Evans, 1998). Sharwood Smith (1993, 1991) points out that it is possible learners may not notice second language structures made more salient by input enhancement and, further, if learners indeed do notice any enhanced features, they still may not exhibit any effects on their learning from input enhancement. Externally enhanced input does not guarantee learning or the internalization of any of the enhanced target language features or forms (Sharwood Smith, 1993, 1991).

Explicit Grammar Instruction

The view that grammar has a limited use in SLA makes some language instructors nervous because many are still asked to teach from grammar-oriented textbooks (Garrett, 1986). There tend to be two issues with respect to explicit instruction of grammar in second language classrooms. The first issue is whether or not instruction makes a difference and if it is beneficial to second language acquisition; the second involves what can or should be taught (VanPatten & Cadierno, 1993a). Garrett (1986) believes the key question is what *kind* of grammar should be taught rather than *whether* it should be taught. For example,

she indicates that traditional grammar that treats forms as separate from meaning does not promote communicative abilities and would probably not be the kind of grammar teaching one should implement.

In general, grammar has been presented in foreign language textbooks as a set of descriptions of a language's formal features along with its accompanying rules. While students are no longer required to recite grammar rules, they are expected to have the ability to use such rules in order to express themselves correctly in the target language. This ability is supposedly achieved through drill and practice but, ideally, is demonstrated in spontaneous communication that uses correct grammatical forms and not in discrete-point tests (Garrett, 1987).

Garrett (1986) maintains that some explicit explanation and drilling of grammar is both beneficial and necessary for secondary and post-secondary learners. Several types of drills have been utilized in second language learning and teaching, including mechanical, meaningful, and communicative drills. Mechanical drills exclusively focus on form**s** and can be completed without learners having to pay any attention to meaning, such as the transformation of form from "I ate an apple. What did I eat?" to "You ate an apple." (DeKeyser, 1998, p. 50). Meaningful drills require learners to process meaning without repeating information the hearer already knows, such as "Is this a pen or a pencil?" to "It's a pencil." (DeKeyser, 1998, pp. 50-51). Communicative drills require conveying actual content information that is not known to the hearer, such as "What did you do this weekend?" to a learner's response "I went fishing." (DeKeyser, 1998, p. 51).

DeKeyser (1998) believes it is not detrimental to have activities, such as mechanical drills, that completely focus attention on forms at the beginning of the second language learning process. DeKeyser points out, however, that the goal of this type of drill is to develop, test, and refine declarative knowledge. Therefore, learners should not be rushed through such exercises and should have plenty of time to think and focus their attention on the activity in order that these kinds of drills are not so repetitive and meaningless as to preempt either attentive learning processes or the possibility that noticing will occur, both of which may lead to learning the structures or forms being drilled. These types of activities do not have to revert to the *drill and kill* exercises rejected from behaviorist learning theory (DeKeyser, 1998). Grammar should be taught in a manner that does not separate form from meaning, one in which form and meaning are integrated to produce grammatically accurate messages (Garrett, 1986). Focus-on-form instruction must, therefore, occur in conjunction with communicative interaction and must not interrupt it. It is possible to incorporate a focus on form such as explicit grammar instruction without sacrificing a more communicative focus (Doughty & Varela, 1998).

Benefits of Focus-on-Form Instruction for Second Language Learners

The effects of instruction are probably gradual and cumulative, rather than instantaneous (Long & Robinson, 1998). Noticing is the intended outcome of focus-on-form instruction, which may benefit learners by leading them to attend to specific second language features when they occur in communicative input. Focus-on-form instruction may equip learners to notice language structures they

did not notice when focused only on meaning (Lightbown, 1998; Long & Robinson, 1998; Schmidt, 1993b, 1990; Schmidt & Frota, 1986). By being aware of grammatical structures and features, learners are more likely to notice such features in the input, suggesting one valuable function of instruction is to increase salience of target language forms (Schmidt, 1993a, 1990; Schmidt & Frota, 1986). Schmidt (1990) further hypothesizes that paying attention to language form is not only facilitative but may in fact be necessary for adult acquisition of redundant grammatical features, and concludes that forms must be noticed in order to be learned.

The primary aim of focus-on-form instruction is to promote accuracy; however, learners may exhibit emergent interlanguage forms before producing accurate target forms because language learning is not instantaneous (Doughty & Varela, 1998). Although formal instruction can have a delayed effect, learners who receive such instruction may learn more rapidly than those who do not. Second language knowledge gained through formal instruction may not be immediately available for use in spontaneous conversation, but soon becomes useful once learners have an opportunity to use second language knowledge in this type of communication (Ellis, 1985). Further, effects of instruction attributable to noticing may not be immediate either, but may result from a delayed interaction between target language features that were noticed and the availability for recall of those features. Several second language researchers suggest learners must attend to linguistic features (form) in the input as well as to the message (meaning), and have conducted studies whose results indicate some sort of focus-on-form instruction is beneficial to learners (Williams & Evans,

1998; Alanen, 1995; Jourdenais et al., 1995; Leeman et al., 1995; Robinson, 1995a, 1995b; VanPatten & Sanz, 1995; Schmidt, 1994, 1990; Spada & Lightbown, 1993; VanPatten & Cadierno, 1993a; Doughty, 1991; Long, 1991; White, et al., 1991; Lightbown & Spada, 1990; Sharwood Smith, 1986).

Lightbown and Spada (1990) found that form-based instruction within a communicative context contributes to higher levels of linguistic knowledge and performance. Their findings suggest that accuracy, fluency, and overall communicative skills are probably best developed via instruction that is primarily meaning-oriented but that also provides guidance through form-focus activities. Classrooms that provide a focus on form within contexts of meaningful communication are more effective than those that avoid focus-on-form instruction altogether, or those that emphasize it to the exclusion of communicative activities (Lightbown & Spada, 1990). Further, Spada and Lightbown (1993) provide evidence of long-term effects of instruction, at least with respect to the question formation they investigated. Learners in Spada and Lightbown's study demonstrated pretest to posttest gains in accuracy on oral production tasks, and maintained this gain five weeks later in a follow-up test.

White, Spada, Lightbown, and Ranta (1991) investigated the effects of input enhancement as focus-on-form instruction on the syntactic accuracy of 11-year-old ESL students. Results indicated input enhancement and negative evidence in the form of correction helped these learners to "unlearn" an incorrect analysis. Their findings also showed long-term improvements in accuracy for both oral and written tasks.

Doughty (1991) investigated the effect of instruction on acquisition of English relative clauses by non-native English speakers. Participants in Doughty's study were divided into three groups: a control group that received exposure only to text containing relative clauses without any specific focus-on-form instruction; and two experimental groups that focused on form via different types of instruction on the formation and use of English relative clauses. One experimental group was taught using a comprehension-based approach (meaning-oriented group), while the other group received more traditional rule-based instruction (rule-oriented group). Learners in all three groups were directed toward the goal of understanding reading texts well enough to be able to answer questions and write a recall summary of the content. The experimental treatments were designed to facilitate an improvement in instructed learners' ability to relativize in English; the control treatment was intended to provide only exposure to English sentences with relative clauses. For both experimental groups, visual—or non-linguistic—perceptual cues served to focus learners' attention on the major components of relative clauses. Specifically, both groups received reading texts containing an artificially high proportion of marked relative clauses.

Results indicated instruction had at least a short-term positive effect on the learning process. The rule-oriented and meaning-oriented groups both performed better in written production than the control group, and both instructed groups improved significantly in comparison to the control group. Findings yielded equivalent learning for both focus-on-form conditions in which attention to meaning plus attention to formal features, facilitated by the input enhancement techniques Doughty used, had advantages over attention to meaning alone.

Doughty's study demonstrated that focus on form in a meaningful context can affect the accuracy of second language output. Doughty points out that there are a variety of ways to encourage learners to notice forms that do not involve traditional methods of metalinguistic discussion, such as the input enhancement techniques she used. While Doughty's findings may apply only to this particular group of learners, Metcalfe (1997) believes her results are encouraging for those instructors who see a role for formal instruction. Doughty's investigation demonstrates the importance of drawing learners' attention to the target of instruction, and supports the premise that noticing features of a target language is beneficial for acquisition.

Alanen (1995) investigated the effects of input enhancement on second language acquisition of structural language elements, specifically locative suffixes in semi-artificial Finnish. The aim of her study was to ascertain the role of explicit rule-based focus-on-form instruction versus implicit meaning-based instruction. Input was manipulated in two ways, as visual enhancement of target structures and as explicit rule presentation. Participants were divided into four groups that received variations of the same reading text: (a) the control group received unenhanced text only; (b) the visual enhancement group was given text in which the targets embedded in the input were printed in italics to make them perceptually salient; (c) the rule group received a one-page explicit description of the grammatical rules governing use of the learning targets, along with unenhanced text; and (d) the rule-and-enhance group was given both the rules and the version of text that contained italicized learning targets.

Alanen's results indicated both groups that received explicit rule-based instruction outperformed the two that did not receive such instruction. The overall effect of explicit rule-based instruction on acquisition of Finnish locative suffixes seemed to be beneficial. Treatment that learners received in the experimental groups affected their performance in two ways: it intensified their acquisition rate of linguistic forms on a syntactic and phonological level; and it affected the acquisition process so that all learners in the treatment groups showed some evidence of having acquired at least some of the forms. There were, however, two tendencies in Alanen's investigation that were especially important. First, while the rule-based groups were fairly accurate in restating rules, they failed to apply all rules fully in actual language production. The second tendency was that the meaning-based groups tended to form rules about linguistic input that were based upon incorrect assumptions.

Findings from Alanen's investigation suggest input enhancement had some effect on learners' attention to target forms. Learners noticed target structures, which appears to have been sufficient for some learning to take place. Alanen's (1995) study further supports Doughty's (1991) results and Long's (1991) suggestion that focus on form may be the major factor underlying the effectiveness of instruction. Alanen's results also support VanPatten and Cadierno's (1993a) and VanPatten and Sanz's (1995) studies. Results from the latter two studies demonstrated the benefits of rule explanation combined with input processing instruction to aid learners' development of automatic access to target language rules in comprehension and production tasks. Further, Robinson (1995a, 1995b) and Schmidt (1994, 1990) have proposed that noticing forms in

the input is a prerequisite to their being acquired. Robinson (1996a, 1995a) found that instruction facilitated accurate performance on easy rule sentences, supporting Schmidt's claim that noticing at the level of awareness facilitates learning, at least with respect to the simple rules Robinson investigated. Neither Alanen's results nor those of the other aforementioned researchers support the claim that learning can occur without noticing.

Jourdenais et al. (1995) examined how input enhancement in the form of textual modification affected learners' use of the preterit and imperfect in Spanish, both of which are frequent and semantically important. Participants received two variations of a reading text that contained Spanish preterit and imperfect forms, either unenhanced or as text in which target forms were highlighted. Learners who received input enhancement later produced more target features in their written work compared to the text-only control group. Furthermore, learners who received enhanced text not only produced more target forms but also used them more frequently in obligatory contexts. These results suggest textual enhancement promotes noticing of second language target forms, affects processing of input, and has an effect on learners' written output. The Jourdenais et al. study provides evidence that input enhancement can be an effective means of drawing learners' attention to target features in a second language, suggesting textual enhancement may lead to better subsequent written production of target language forms.

Leeman et al. (1995) investigated the effectiveness of focus-on-form instruction for learning preterit and imperfect tenses in Spanish, obtaining results similar to those of Jourdenais et al. (1995). Specifically, Leeman et al. examined

the effects of two types of content-based instruction[2] on two groups of learners: a purely communicative focus-on-meaning group versus an integrated focus-on-form group. In an attempt to draw learners' attention to target usage of preterit and imperfect tenses in Spanish in order to improve accuracy and increase use, the treatment group received text with input enhancement via highlighting, underlining, and color coding of target language forms to be noticed. With respect to the purely communicative group that did not receive input enhancement, the aim was to determine whether it is possible to increase accuracy and use while still maintaining a sole focus on meaning. In addition to receiving input enhancement, the focus-on-form group also was told to pay special attention to how temporal relations were expressed in the text materials.

Results indicated that the integrated focus-on-form group maintained or increased accuracy, while the purely communicative group improved only slightly. Leeman et al. suggest that the positive effects of instruction seemed to result from increased learner attention to target language forms, and that learners' accurate use of specific forms can be increased within a communicative context. These researchers further suggest that the textual enhancements provided by focus-on-form instruction served to make target forms more salient, thus attracting learners' attention to the forms that may facilitate and increase acquisition of those forms.

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[2]Leeman, et al. (1995) considered content-based instruction as instruction in which specific topics, such as history or literature, are discussed in the target language. Content-based instruction is often purely communicative but can contain a focus-on-form component. Purely communicative content-based instruction makes no attempt to draw learners' attention to formal aspects of the language, and any error correction is of incorrect information rather than of inaccurate use of language (Leeman et al., 1995).

Jourdenais et al. (1995) and Leeman et al. (1995) propose a teaching approach that embeds some focus on form within an otherwise communicative approach, one in which various techniques are used to draw learners' attention to linguistic forms found in the input while retaining a focus on meaning. In such an approach there is no explicit metalinguistic commentary nor decontextualized teaching of grammar. Leeman et al. (1995) argue it may be more worthwhile to simultaneously integrate attention to form with attention to meaning, rather than isolate attention to form as a separate component. Humans are considered to have a limited-capacity attention system; therefore, performance on an attention-demanding task usually declines when they are required to perform a second task simultaneously (Tomlin & Villa, 1994; VanPatten, 1989). Performance on the first task, however, is not adversely affected if both are somehow compatible (Tomlin & Villa, 1994). Thus, focus-on-form activities designed to integrate attention to form with attention to meaning should require less division of learners' attentional resources (Doughty & Williams, 1998a).

It seems likely that input enhancement could be an effective focus-on-form technique, at least for adult learners (Doughty & Williams, 1998a). The aforementioned studies lend support to the premise that learners are more likely to acquire forms they notice than those they have not noticed in any way. The issue of noticing is important for language instructors because it may be possible to change the level of salience of linguistic or grammatical forms in the input, and to encourage learners to notice certain forms and constructions (Doughty & Williams, 1998a). Williams and Evans (1998) point out, however, that frequency of forms in the input or increased salience are not the only factors to consider. In

their (1998) study learners improved performance on participial adjectives but not on the passive construction, even though both were made salient and frequent in the input. These results led Williams and Evans to suggest that although forms such as articles and gender or case assignments are often frequent in the input, they still appear to lack salience for many second language learners. This pattern may occur because there is little semantic or communicative motivation to use articles or assign gender since lack or inaccurate use of either does not necessarily result in loss of meaning (Doughty & Williams, 1998a).

Such phenomena also seem to apply to inflected Romance languages such as Spanish that do not rely on subject pronouns to indicate who performs the action of the verb. Rather, person-meaning is incorporated into verb endings that also indicate aspect. Many foreign language students who are native English speakers, or whose first language requires use of subject pronouns, often transfer this requirement to their use of Spanish regardless of being instructed not to do so. Apparently, verb endings in Spanish do not necessarily carry any meaning for these learners and are thus redundant. Metcalfe (1997) and Doughty and Williams (1998a) have conducted research that supports this observation, and Doughty and Williams further observe that acquisition of particular forms or constructions may be delayed if such forms do not have any perceived communicative function or meaning. Their observations further support the premise of integrating a focus on form with a focus on meaning.

Implications of Focus-on-Form Instruction for Second Language Learners

The effects of teaching grammar and linguistic forms may not be immediately visible as an improvement in the grammaticality of learners' spoken or written production (Hulstijn, 1995). Instead, the main effects of focus-on-form instruction may be to help learners bring order to second language input, organize their knowledge, accelerate classroom learning processes, and develop linguistic accuracy. Explicit formal instruction may not lead directly to automatic, productive use of language, but it is valuable in that it could assist learners to bring order to the target language input to which they are exposed. Further, focus on form might facilitate understanding of that input and may boost or support natural acquisition processes (Schmidt, 1995). Grammar instruction also may help segment the overwhelming amount of input to which learners are exposed by establishing links between form and meaning, especially with respect to morphology that is not always salient or semantically necessary (DeKeyser, 1994).

Knowledge is a system learners build based upon exposure to language that leads to formation of some systematized beliefs about language, some of which may deviate from native-speaker norms (Sharwood Smith, 1993). According to Garrett (1987), language learners older than elementary school age need some sort of organizing principles for their developing second language knowledge. Garrett suggests that some focus on linguistic form and on grammar serves as such organizing principles. Sharwood Smith (1988) also believes it is difficult to deny adult learners explicit information about a target language

because their intellectual maturity and previous learning experiences influence their desire for explanations, which may serve as a shortcut to learning for adults.

Terrell (1991) proposes that explicit grammar instruction can aid acquisition by providing information that acts as an advance organizer to help learners process second language input. Explicit instruction may also be used to make a meaning-form connection for complex morphology. Terrell points out that classroom learners may not be able to acquire a verb system as complex as those of Romance languages without explicit grammar instruction due to the limited amount of exposure inherent in classroom second language learning. Terrell believes some grammar-focused activities are therefore necessary since classroom learners will not come close to the number of hours of input necessary for natural language acquisition. It may be more "natural" to learn languages intuitively; however, such learning may also take a long time before enough knowledge and skills have been acquired to use the language (Sharwood Smith, 1988). Focus-on-form instruction may serve to accelerate the classroom language learning process.

The central pedagogical question with respect to focus-on-form studies is how to develop linguistic accuracy in classroom learners without compromising development of communicative fluency (Doughty, 1998). Learners whose classroom experience has stressed grammatical accuracy often cannot produce or understand natural speech. Conversely, learners whose classroom experience has stressed communication of meaning are often inaccurate and may even have stabilized in their linguistic development. It is important to achieve a balance between accurate production of second language forms and production of meaningful communication in real contexts (Doughty, 1998). Focus on form may

not lead to immediate interlanguage changes that are manifested as increased accuracy, but instead may lead to restructuring that reflects increased complexity (Doughty & Williams, 1998a).

Doughty and Williams (1998a) take the position that adult second language learning is fundamentally different from first language learning; therefore, it is ill-advised to leave learners on their own to discover form-function relationships and linguistic intricacies. Doughty and Williams emphasize that this statement does not mean they advocate a constant focus on all forms for all learners at all times. Rather, these researchers suggest the need to find a pedagogically sound and empirically grounded position between focus on form and focus on meaning. Instead of allowing learners to gather language data on their own, Doughty and Williams propose it is likely that more language will be learned more efficiently with second language classroom instruction that engages the cognitive abilities of the learners.

VERB LEARNING IN SLA

Second language verb endings and tenses often pose difficulties for learners. For example, verb endings in a Romance language such as Spanish may not be salient to learners whose native language is English. English uses subject pronouns and adverbs of time to convey who performs the action of a verb and when that action occurs, whereas Spanish verbs are inflected to convey person, tense, and aspect. Because English does not communicate meaning in this manner, learners may not perceive Spanish verb endings as necessary in order to convey meaning or may not notice them at all. Languages that require verb

inflection, such as Russian or the Romance languages, impose a heavy morphological burden on the learner that good computer exercises may be able to alleviate (Blake, 1998).

Drill and practice exercises, derogatorily referred to as *drill and kill*, have received much negative criticism because they are seen as a return to the rejected behaviorist theory of language learning, especially when used in isolation from meaningful language contexts (Blake, 1998). Blake believes foreign language curriculum can be supported by a variety of educational materials, including some with a clear focus on form such as drill and practice exercises for learning verb forms. Foreign language learners may master some isolated phonological, morphological, syntactic, orthographic, or semantic aspects of a target language, but may not always be able to apply discrete-point knowledge, such as accurate usage of verb structures, to highly integrative tasks like translation, composition, or spontaneous conversation (Stokes, 1985).

Difficulties Associated with Learning Second Language Verb Forms

Metcalfe (1997) proposes that problems with verb learning seem to differ in nature than those in other areas of language study such as vocabulary, because learning verbs requires a deeper understanding of language. Metcalfe (1997) and Metcalfe, Laurillard, and Mason (1996, 1995) found that problems associated with written French verbs are related to both form, including inflectional morphology and auxiliaries, and function, in appropriate use of tense. Learners in beginning levels of foreign language study make frequent formal errors such as use of infinitives with pronouns and inability to form present and past tenses.

Higher level students' problems center around use and formation of tenses, lack of subject-verb agreement, omission of auxiliary verbs, use of present tense instead of perfect, and haphazard use of present and future tenses (Metcalfe et al., 1996). As cited by Metcalfe et al., the same types of difficulties encountered learning French verbs seem to apply as well to learners of Spanish at various levels of study.

Metcalfe (1997) hypothesizes that an increase in oral work has contributed to a decline in written performance with respect to verb usage due to the amount of time allocated for each skill. Written work has been getting much less emphasis in recent years in comparison to oral work. It is possible that a greater emphasis on speaking skills as a result of the communicative approach has had a direct influence on the way in which French is written (Metcalfe et al., 1998, 1996; Metcalfe, 1997).

Oral usage versus written usage is another issue related to learning target language verb forms. It is possible to avoid entirely the use of a verb in an answer when responding to oral questions during an oral test; however, use of a verb cannot be avoided in written messages (Metcalfe et al., 1995). To further illustrate their point, Metcalfe et al. refer to the research of Harley and Swain (1978) who found that immersion learners reduced redundancy in verb systems without affecting meaning. The immersion learners tended to lack verb forms in their oral production that were irrelevant to meaning or for which grammatically less complex alternatives existed. Metcalfe et al. (1995) suggest verb usage may be allowed to fossilize once communication needs are met.

With advent of the communicative approach, there is less emphasis on understanding verb tenses, structures and related concepts, and more emphasis on comprehension and communication for which a verb may be relevant only as a lexical item (Metcalfe et al., 1996). For example, in order to convey meaning of time or person, neither verb endings nor verbs themselves are always needed. In some contexts verb inflections are redundant, adding no extra meaning to an utterance or text if the notions of time and person are established by other means, such as use of subject pronouns or adverbs. Metcalfe et al. (1996) and Garrett (1986) suggest that learners therefore pay less attention to verb endings, may view them as rather pointless, and consider verb endings redundant in processing terms when a subject or an adverb of time is present. Learners themselves were asked what difficulties they perceived with regard to learning verbs (Metcalfe et al., 1998, 1996; Metcalfe, 1997). These particular learners cited such problems as confusing the endings and structures for different tenses—especially the past and perfect, the quantity of irregular verbs they had to learn in addition to regular paradigms—and frequent uncertainty as to which verbs were in fact irregular (Metcalfe, 1997).

Explicit learning of verb forms by memorizing verb tables is not viewed as a solution to the aforementioned problems because students often can complete verb paradigms with correct forms, but cannot subsequently use verbs accurately in a written sentence (Metcalfe et al., 1998, 1996). Methodical learning of verb tables is hardly helpful if second language students have not also learned verb functions as well, and if they treat each verb as a separate system (Metcalfe, 1997). Metcalfe found that the application of a paradigm model to other verbs was

not understood, even by learners who knew verb paradigms reasonably well. Lack of acknowledgment that one verb paradigm can be generalized to other paradigms takes away the point of learning them in the first place. It is inefficient and impractical to learn verb forms as separate vocabulary items because this practice places a huge cognitive burden on the learners (Metcalfe et al, 1998, 1996). Learners who knew verb endings fairly well expressed that they experienced cognitive overload, as the following two students indicated (Metcalfe et al., 1998, p. 15):

> You do one tense then you do the next one, you get it like mixed up...you start putting endings on the wrong ones.
>
> There's so many of them, they just go on and on and on. They're just not interesting to learn.

While explicit instruction of verbs is not in itself the solution to problems encountered in verb learning, neither will exposure to input alone through implicit means guarantee useful learning (Metcalfe et al, 1998, 1996). The following example from Metcalfe et al. (1998, p. 17) illustrates this point by showing how one learner had acquired, retrieved, and applied a "rule" although the "rule" was incorrect:

> You have an accent on with *je* in front, I couldn't remember whether you took it off or added on -s with *il* in front...when you have *je* in front of an *er* verb, you put *é* .

According to Metcalfe et al., this example seems to be the kind of mistake that can be made if grammatical rules are induced by exposure to data with little explicit instruction. The researchers contend that this particular student had seen more examples of *je* followed by *-é* than by anything else and thus concluded, incorrectly, what the rule for correct usage must be.

In summary, despite an improvement in other aspects of foreign language study at beginning levels, there seems to be a distinct and continuing downward trend in grammatical awareness and accuracy, to include verb production. There are learners who have no concept of tense, and at the extreme there are those who ignore verbs altogether (Metcalfe et al., 1995). Findings from Metcalfe (1997) and Metcalfe et al. (1998, 1996) imply that extreme explicit or implicit approaches to grammar teaching are largely unsuccessful with respect to learning target language verb structures. Learning verbs from tables can become pointless if not closely related to communicative tasks, while exposure to language data alone may result in incorrect hypotheses. What can the language teaching profession do in order to alleviate this seemingly no-win situation?

Suggested Activities to Aid Verb Learning in SLA

Communication should not be considered unrelated to accuracy, but rather dependent upon it (Metcalfe et al., 1995). Metcalfe et al. propose that a possible solution to some of the problems with verb learning would be a move back towards accuracy, because their research indicates that some explicit practice with verbs may actually help communication. Learners seem to construct their own rules when none come to mind, suggesting that at least some adult learners need some rules to act as organizing principles for verb formation (Metcalfe et al., 1998, Metcalfe, 1997). A consciousness-raising approach or a form of input enhancement (Sharwood Smith, 1993) is one possibility for avoiding a return to less acceptable traditional grammar-learning practices that teach forms in isolation from meaning. Harley (1993) proposes that explicit reference to written

(French) verbs at an early stage of learning might be beneficial. Early reference to Spanish verbs could thus be useful for learning them as well.

Metcalfe (1997) investigated the utilization of CALL exercises as a partial solution to the problems encountered in written production of French verbs. His results indicated learners seemed to exhibit a heightened awareness of language in general, and of verbs specifically, even after only brief exposure to material provided by CALL exercises. Metcalfe found there are still no clear-cut answers for verb learning, but gave some assurance that the sort of written problems addressed in his study could be aided by instruction. He concludes that, although children naturally learn verbs and verb inflections because they tend to notice everything, adults are able to control their attention and can, therefore, ignore inflections they often consider redundant. He suggests it is psychologically necessary to teach these particular forms explicitly, and that form-focused instruction is helpful with respect to verb learning even in naturalistic immersion classes.

There has been much debate regarding the value and nature of grammar teaching, with few supporters of traditional-grammar instruction and many supporters of no-grammar approaches to second language learning and teaching (Metcalfe, 1997). Because of the problems encountered in learning verb structures and in accurate production of verb forms, Metcalfe proposes that some sort of explicit grammar treatment will be beneficial to pupils learning to use written French verbs. This benefit also may be the case for beginning level learners of Spanish with regard to Spanish verb forms. In Spanish, learners must integrate a fairly large amount of linguistic information in order to produce correct verb

forms (Stokes, 1985). Spanish verb production is difficult for learners, especially at higher levels of coursework, because the number of verb forms and overall amount of verb knowledge increase.

Regardless of how focus-on-form instruction is delivered (i.e., via consciousness-raising, input enhancement, or explicit grammar instruction), attention to form and attention to meaning must be connected somehow at some point in the language learning process (Long & Robinson, 1998). Although no long-term studies have been conducted as yet, focus on form does not seem to prevent the development of communicative fluency as it is easily integrated into content lessons (Doughty, 1998). Such attention to form, according to Doughty, seems to improve learners' accuracy during communication. If incorporating attention to form benefits the communicative teaching approach and the development of fluency, then a focus-on-form approach will also be advantageous with respect to efficiency. Efficient language instruction is important given the constraint of time as one of the most daunting obstacles to classroom language learning success (Doughty, 1998; Metcalfe, 1997).

In addition to observing learners' verb form production performance that takes place in two learning environments, the present case study also observes learner speech for similarities and/or differences with respect to overall fluency in terms of conversational flow. Before making any observations or attempts to describe learners' overall fluency in oral production, first there must be a discussion of what fluency is and what it is not with respect to SLA.[3]

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[3] The present dissertation is not a study of learner fluency. This aspect of the learners' discourse, however, illustrated noticeable differences between groups as the researcher analyzed the oral data. Fluency in SLA is thus addressed at this point.

FLUENCY IN SLA

Speaking is considered a complex task that requires many different levels of processing, more or less simultaneously (Schmidt, 1992). Learners may internalize a feature or features of the target language, but this learning does not guarantee they will be able to use those features when pressed to communicate (VanPatten, 1998). Fluency in a second language is often more difficult than fluency in a first language since second language production usually requires more planning, more monitoring, and more time (Dechert, 1984).

Definitions and Descriptions of the Concept of Fluency

Teachers, students, educators, and the general public may assume there is some agreed upon meaning for the term *fluency*, however, such is far from being the case (Guillot, 1999; Freed, 1995). Fluency is a term used and understood by both linguists and non-linguists, yet there have been few attempts to specify precisely *what* fluency is (Guillot, 1999; Freed, 1995; Riggenbach, 1991). Fluency is commonly referred to in foreign language teaching; nevertheless, it is difficult to define precisely as a concept (Chambers, 1997), and is often used broadly as a non-technical term that refers to global language ability (Freed, 1995). The term fluency is further associated with such concepts as performance phenomena (Schmidt, 1992; Riggenbach, 1991; Lennon, 1990; Rehbein, 1987), oral proficiency and accuracy (Guillot, 1999; Chambers, 1997; Freed, 1995; Schmidt, 1992; Riggenbach, 1991; Lennon, 1990; Sajavaara, 1987), native speaker speech (Guillot, 1999; Chambers, 1997; Metcalfe, 1997; Riggenbach,

1991; Lennon, 1990), and with various temporal variables (Chambers, 1997; Freed, 1995; Olynak, d'Anglejan, & Sankoff, 1990; Möhle, 1984).

While there have been few attempts to define fluency precisely, several researchers have made an effort to describe fluency and nonfluency in both first and second language oral production. Because it is used as a frequent descriptor of oral performance, it is important that the language teaching profession agree on what constitutes fluency (Chambers, 1997). Chambers cites speed and lack of effort as two main characteristics constituting fluency regardless of the context in which the concept is utilized. Speed, or the amount of speech produced at a given time, can be measured, while effortlessness is a qualitative judgment often based upon a global impression (Chambers, 1997). Lennon (1990) and Schmidt (1992) consider fluency a performance phenomenon or skill, exercised in real time. Further, Lennon (1990) views fluency as one element of oral proficiency that is different from other elements, such as syntactic complexity or the use of idioms, which he considers to be linguistic knowledge.

Rehbein (1987) considers fluency to be speakers' ability to almost simultaneously plan and execute an utterance. According to Lennon (1990), fluent speech is automatic, does not require much effort, and is characterized as "...an impression on the listener's part that the psycholinguistic processes of speech planning and speech production are functioning easily and efficiently" (p. 391). Nonfluency may arise from an inability to produce a grammatical structure, a lapse in comprehension, a problem with pronunciation, or a desire to be precise with respect to word choice (Riggenbach, 1991). Nonfluent speech is effortful and requires a large amount of attention; thus, nonfluent speakers often exhibit many

hesitations, and may seem to be groping for words in an attempt to combine them into utterances (Schmidt, 1992).

Fluency of non-native speakers has long been judged as a factor in target language oral proficiency (Riggenbach, 1991). In a broad sense, fluency is often associated with oral proficiency and general language ability, representing the highest point on a scale that measures spoken ability in a foreign language for which being fluent is a mark of social accomplishment. In a more narrow sense, fluency is presumably an isolatable component of oral proficiency, used diagnostically by foreign language instructors whereby learners may be considered: (a) fluent but not grammatically accurate; (b) fluent but lacking a varied vocabulary; or (c) correct but not very fluent (Lennon, 1990). A more restricted use of the term fluency is, therefore, as one of several identifiable components of language ability or proficiency (Freed, 1995), in which a distinction is sometimes made between fluency and accuracy (Chambers, 1997; Schmidt, 1992).

Learners may know the target language grammar quite well but may not speak the language fluently as illustrated by a lack of hesitations, pauses, or self-corrections (Sajavaara, 1987). Further, according to Sajavaara, linguistic competence and accuracy are not always manifested as fluent speech because one may have, for example, a good command of the structure and vocabulary of a language but still may not be capable of skillful speech performance. Conversely, one may not speak correctly but may still speak fluently with few pauses and hesitations (Sajavaara, 1987). Nevertheless, a relationship between linguistic proficiency and impressions of fluency seems to operate (Chambers, 1997;

Riggenbach, 1991). The term *fluency* is increasingly associated with accurate foreign language oral production, in which accuracy appears to be acquiring a greater degree of salience as a determinant of fluency with respect to target language speech production (Guillot, 1999).

Fluency is not a term generally applied to describe native speaker speech (Guillot, 1999), which may be referred to as articulate but not usually as fluent (Riggenbach, 1991). One may know intuitively or objectively that fluency in a foreign language and fluency in a native language should not be approached in the same way; however, general dictionary definitions suggest that common perceptions of fluency treat both in a similar manner (Guillot, 1999). To describe a person who speaks a foreign language fluently often implies that person speaks like a native. What is usually meant is the speaker has a good command of the second language and uses it easily and efficiently (Chambers, 1997). There seems to be an assumption that the most fluent speech is the most native-sounding (Riggenbach, 1991), and that the fluency target of second language learners is to achieve the fluency level of native speakers (Lennon, 1990). In common usage, however, one rarely hears a native speaker described as fluent in comparison to other native speakers. Rather, native speakers might be described as articulate or eloquent, both of which are related terms. For non-native speakers, fluency is a concept with very real consequences and is used as a standard by which their language skills will be judged, implicitly or explicitly (Riggenbach, 1991).

In the past, second language learners were often expected to aspire to native speaker abilities, which is unfair because learners' language knowledge is not constructed in the same manner as that of native speakers (Metcalfe, 1997).

Furthermore, spontaneous native speaker speech is not error free, syntactically or lexically accurate, homogenous, planned, or formally cohesive; thus, equating fluency to native-like oral production is problematic (Guillot, 1999). Fluency as a criterion may apply to the speech production of an individual, but it does not occur in a contextual vacuum, nor is it always connected only with speech characteristics, but rather with the global experience of a verbal exchange (Guillot, 1999). Second language learners may never reach the high degree of fluency that native speakers achieve (Chambers, 1997), and as Hawkins and Towell (1996, p. 208) further point out, what we expect from second language learners "...must be tempered by the knowledge that most of them will never be like native speakers of the target language."

Schmidt (1992) considers fluency a temporal phenomenon, and speech production an automatic procedural skill for which fluency develops as production processes become automatic. Temporal variables such as speech rate, length and position of silent pauses, length of fluent speech runs between pauses, frequency and distribution of filled pauses, and frequency of repetitions and self-corrections have been suggested as possible measures of fluency (Möhle, 1984). Further, a salient feature of fluent speech appears to be avoidance of extended pauses and use of appropriate pause fillers such as *you know*, *eh*, or *OK* (Olynak et al., 1990). Fluency also seems to be related to a faster rate of speech and to a lack of hesitations (Freed, 1995). Chambers (1997) proposes it is useful to restrict a definition of fluency in spoken production to such aforementioned temporal variables because they provide anchorage for a concept prone to vagueness and

multiple interpretations. Additionally, temporal variables can be identified and quantified empirically (Chambers, 1997).

In summary, fluency is interactive and involves producing, receiving, and responding to messages without jeopardizing the flow of a conversational exchange (Guillot, 1999). Fluency is a criterion often used to assess learners' oral performance by foreign language instructors who generally employ the term to describe oral production and speech flow, for which fluency refers to an absence of such features as hesitations, pauses, and self-corrections (Chambers, 1997). Fluent speech, however, does not necessarily imply an uninterrupted flow that is free of grammatical errors. Good speakers know how to hesitate, be silent, self-correct, interrupt, and complete expressions or leave them unfinished (Sajavaara, 1987). Furthermore, while fluency has been described as ease of communication or as speech that lacks unnatural pauses, Riggenbach (1991) points out that native speaker speech does not always reflect either ease of communication or unnatural pauses, and in fact does include such hesitation phenomena.

Hesitation Phenomena

Difficulties and complications in planning and processing speech are expressed as hesitation phenomena that include unfilled and filled pauses, drawls, repair in the form of repetitions, restarts, or self-corrections and, rate of speech, all of which occur regularly in native and foreign language speech production (Riggenbach, 1991; Dechert, 1984; Möhle, 1984; Wiese, 1984). An unfilled pause is a period of silence usually lasting 0.5 seconds or longer (Riggenbach, 1991). Filled pauses, also referred to as fillers, are easily identifiable non-words or

meaningless sounds such as *uh*, *ah*, *er*, *hmm* or *uhm*, and seem to function as hesitation markers. Filled pauses also may be lexical items, *you know* or *OK* for example, which do not normally contribute additional lexical information but rather seem to function as linguistic padding (Guillot, 1999; Chambers, 1997; Freed, 1995; Riggenbach, 1991; Lennon, 1990; Raupach, 1984).

Hesitation phenomena appear to be a salient determiner of fluency for which frequency of unfilled pauses is one of the most conspicuous features that indicates a lack of fluency (Riggenbach, 1991). Length and frequency of silences and hesitations affect listeners' perceptions of speakers' fluency. Although pauses and hesitations are normal features of a conversational interaction, silence is often viewed as a sign of dysfluency, especially in foreign language speech where it may be perceived as the poor functioning of mental processes rather than as a normal feature of speech processing (Chambers, 1997). Use of filled pauses as a hesitation device might mean greater insecurity on the part of a speaker, and is therefore often a characteristic feature of second language speech production since learners tend to be less secure with their oral language than native speakers (Möhle, 1984). Hesitation phenomena are often treated as an undesirable byproduct of efforts to communicate, particularly with respect to those of second language learners (Guillot, 1999). Speech-pause relationships and frequency of hesitation phenomena such as filled and unfilled pauses and repetitions seem to be important areas of performance with regard to descriptions of fluency (Lennon, 1990).

Hesitation phenomena are not necessarily undesirable because they do serve a purpose in both first and second language speech production. For instance,

pauses, hesitations, and fluctuations in rate of speech or articulation may be deliberate on the part of a speaker, particularly in planned speech. Hesitations, repetitions, pauses, and changes in pitch and tempo often operate as devices for signaling or recognizing discourse units, syntactic boundaries or pragmatic intentions, and have been shown to be instrumental in keeping, surrendering, or taking control of a conversational topic (Guillot, 1999). Hesitations and pauses are not always intentional, however, but may result from the demands of a speech production task and can reveal the cognitive activity of a speaker, especially with regard to unplanned speech (Guillot, 1999). Even the most fluent speakers experience planning difficulties on occasion (Dechert, 1984).

In first language production, speakers usually hesitate more when attempting to express new thoughts than when involved in a routine oral exchange (Chambers, 1997). Increased use of pauses and fillers may suggest a high processing load, especially for second language learners (Kasper, 1998). Due to lack of automatic processes and incomplete knowledge systems, learners may need more processing time in order to plan and monitor their speech than that which native speakers require (Guillot, 1999; Temple, 1988). Hesitation phenomena can act as time-gaining devices as speakers gather their thoughts, and tend to occur at points where verbal planning is taking place. Pauses, false starts, and repetitions further operate as devices that permit error correction in utterances that have not yet taken place or that have been vocalized already, and generally point to a speaker's struggle to achieve control over planning, processing, production, and post-articulatory editing (Guillot, 1999). The majority of filled and unfilled pauses occur at major planning points where task stress is greatest in

order to provide thinking-space as a speaker proceeds with message construction (Guillot, 1999).

Although speakers accept pauses in their native language, not all pauses are acceptable; some are considered natural while others are considered unnatural. Natural pauses generally occur at a clause juncture or after groups of words that form a semantic unit to allow breathing space. Pauses appearing in other locations are deemed unnatural, judged as hesitations that reveal either lexical or morphological uncertainty. Monitoring for morphological accuracy is less likely to occur in native speaker speech, but does in fact occur frequently with foreign language learners and usually depends upon their overall linguistic proficiency. Pauses occurring in the middle of an utterance often indicate various types of searches, from lexical- or grammatical-form type to searching for information or an idea (Chambers, 1997).

Listeners tend to be more tolerant of pauses that occur at clause boundaries than of those that occur within a clause or phrase. Pauses occurring in the latter location are more likely to be perceived as longer in duration than those of equal length that occur at phrase boundaries (Lennon, 1990). Fluent-sounding short pauses occur at predictable places—clause or phrase junctures—illustrated by the following utterance: "I'm interested in that subject (.3) and I pursued it further" (Riggenbach, 1991, pp. 426-427). Dysfluent-sounding short pauses occur at places other than clause boundaries, such as within a clause or phrase where pausing tends to result in speech that is described as choppy rather than smooth: "So I think we should live (.3) with our old parents or even (.) old grandpa (.) together" (Riggenbach, 1991, p. 427).

Fluency and Second Language Learner Speech

Second language learners generally speak more slowly than native speakers (Lennon, 1990), and tend to interrupt the flow of their speech more than native speakers do (Raupach, 1984). Thus, learners' second language oral production results in relatively short strings of speech uttered between two pauses (Raupach, 1984). According to Raupach, at a certain level of second language competence most planning activities must occur during unfilled pauses, or periods of silence, and during filled pauses because learners generally lack sufficient knowledge to produce speech more automatically. An important difference between fluent and nonfluent second language learners is that the pauses, false starts, and other hesitations exhibited by nonfluent learners reflect a need to focus attention on lower levels of planning. Fluent learners act more like native speakers who manifest hesitation primarily as a reflection of integration and macroplanning (Schmidt, 1992).

In an attempt to quantify characteristics of second language learner fluency, Lennon (1990) conducted a study that explored the extent to which speech production performance features are good indicators of perceived fluency. Lennon's results indicated that variations in speech rate among speakers reflected differences in pause time, rather than in speed of articulation. Additionally, filled pauses seemed to serve planning functions, and position, length, and frequency of individual pauses were also considered important aspects of perceived fluency. Learners who reduced the number of filled pauses, increased length of fluent runs

between pauses, and eliminated disruptive internal pauses—within utterances—were associated with improvements in perceived fluency.

Riggenbach (1991) investigated what features may contribute to the perception of fluent versus nonfluent non-native speakers, obtaining results that support Lennon's (1990) study. Participants in Riggenbach's study were divided into two groups: low fluency and high fluency. Results indicated that rate of speech and unfilled pauses contributed to judgments of nonfluency, and use of such hesitation phenomena was a salient feature in determining level of speaker fluency. The low fluency group's oral production contained fewer filled pauses that were lexical compared to the high fluency group, which further contributed to the perception of their speech as non-native-like. In addition, the low fluency learners did not produce pauses that were considered native-like because the majority occurred within an utterance, contributing to an impression of choppiness in their speech, as illustrated in the following example:

> ...because we have (th) uh three girls: in a (.30) in a family and uh: three of us: (1.2) uh bo- uh all of us: (.) are older than (.) my: younger brother (Riggenbach, 1991, p. 431).

Conversely, many of the short pauses produced by the high fluency group were considered native-like since they occurred at clause boundaries.

Riggenbach states that results from her investigation should be accepted with some reservations because of small sample size. Findings are thus tentative, and limited to these particular learners, making the study descriptive and exploratory. Learners in her study were broadly classified as less fluent or more fluent based upon frequency of unfilled pauses alone; more hesitations indicate lower fluency and fewer hesitations indicate higher fluency. Riggenbach suggests

these patterns could be a possible trend that would need to be validated by future studies of this type with larger sample populations. Riggenbach submits that her findings may not be generalizable to other non-native speakers, but still may contribute to establishing descriptions of fluency.

It may be possible to assess learner fluency by studying a variety of temporal variables, such as speech rate: that includes words or syllables produced per minute, length and position of silent pauses, length of fluent speech between pauses, along with frequency and distribution of pauses, repetitions, and self-corrections (Möhle, 1984). These same features, however, are found in fluent native speaker production; thus, Lennon (1990) believes the frequency and distribution of such features, not their presence or absence, may distinguish native speaker performance from that of non-native speakers.

How Can Second Language Learners Become More Fluent?

Fluency, it seems, cannot be taught but rather is left to emerge as a byproduct of opportunities created for verbal interaction (Guillot, 1999). Foreign language teaching has not produced the ability to speak fluently in the target language, except in rare cases, although grammar rules have been explained to the learners (Clahsen, 1987; Sajavaara, 1987). Furthermore, comparative studies of hesitation phenomena in native and non-native speech production suggest that differences that appear to be significant relate to frequency of pauses rather than their length, and to the location of those pauses in an utterance. Therefore, becoming fluent is not about speaking faster, but rather about pausing less often and at appropriate junctures in an utterance (Chambers, 1997).

Sajavaara (1987) believes learners can become fluent in a foreign language only if they automatize required linguistic operations, and Schmidt (1992) suggests fluency in a second language develops gradually through practice. Schmidt points out that while practice has not been empirically demonstrated for any components of second language fluency, observation of improved fluency is more easily noted at the beginning of active target language use, with a gradual slowing of improvement over time. It may be possible that the psycholinguistic processes of monitoring, paying attention, and noticing could assist development of fluency in second language learners by aiding development of automatic linguistic processes.

Speaking is not a fully automatic process; it is accompanied by the psycholinguistic control process of monitoring (Green & Hecht, 1993) that can enhance fluent speech production (Rehbein, 1987). Monitoring is an important control function in both first and second language production, involving management of potential errors (Dechert, 1984), paying attention, and production of output, all of which may enhance the efficiency of second language acquisition in several ways (Kormos, 1999). According to Kormos, one manner in which monitoring enhances acquisition is that it entails checking both internal and external speech against the learners' existing linguistic system. Thus, monitoring can contribute to learners noticing a gap in their knowledge that may further acquisition processes because noticing a gap in one's second language knowledge and noticing an error can promote learning (Schmidt, 1994, 1993a, 1990; Schmidt & Frota, 1986). Green and Hecht (1993) found that second language students

constantly and, for the most part, successfully, monitor their own oral production often as self-corrections.

Self-corrections are overt manifestations of the monitoring process (Kormos, 1999), belonging to the attentional processes that accompany those procedures that are not fully automatic (Green & Hecht, 1993). Self-correction is the process of comparing a desired form to one actually produced (Green & Hecht, 1993). When speakers detect that their output has been inappropriate, or contained errors, they often halt the flow of their speech and may execute a correction (Kormos, 1999). Self-correction seems to be a natural process in first language production and may contribute to the learning process in second language acquisition (Green & Hecht, 1993). Self-correction may lead to improvement of an original form or utterance, or could result in further error. Green and Hecht (1993) found that the forms of self-correction learners produced were successful, very similar to those produced by native speakers, and seemed to occur in second language production despite attention to meaning and the constraint of time. All speakers monitor their speech to maintain well-formed utterances (Wiese, 1984).

SUMMARY

Focus-on-form instruction is based in part upon the premise that attention and noticing are important aspects of second language learning. The present review of the literature discussed the benefits of focus-on-form instruction for SLA since meaning-only approaches do not always produce learners who can use the target language accurately. The chapter also illustrated that while verb

learning has been shown to be problematic, some type of explicit grammar instruction seems to alleviate at least some of the difficulties related to learning and producing accurate verb forms.

Regarding the use of technology in SLA, Garrett (1989) does not believe it is possible to conduct experiments that ascertain whether use of technology improves learning. Rather, she believes it is possible to conduct research that explores smaller aspects of the use of technology, such as what kind of technology may be beneficial, whether it improves learning for a certain kind of learner, or for specific target language features. The present case study attempts to address the latter issue by observing how computer technology applied to learning a specific target language feature—verb structures—could benefit beginning learners of Spanish as part of their language learning curriculum. The computer-assisted verb activities may have a positive effect on learners' attention to Spanish verb forms so that they will then notice, learn, and use the forms accurately in both oral and written production. The current trend is to implement technology in university-level foreign language programs whereby computer or electronic versions of print-based courses are being developed. The qualitative research submitted in this case study is presented with the hope that it may provide insight that is useful to researchers, developers, and university administrators, faculty and staff who are beginning the process of implementing computer technology in their language programs so they will not have to reinvent the proverbial wheel.

CHAPTER THREE

Methodology of Data Collection and Analysis

In order to answer the second and third research questions regarding improvement in verb production described in Chapter 1, both quantitative and qualitative data were obtained. The present case study included two groups of participants—six sections of Computer-Assisted learners and five sections of Classroom-Only learners. The class sections were included based on each instructor's willingness to participate in the study. The study also used statistical analysis of pretest and posttest measures to define and describe the verb production of the two groups of learners at the beginning and end of the semester. Because the learners are from two diverse populations, statistical analysis is utilized for descriptive purposes and not as a means of making generalizations beyond this case study experience. The following sections describe the study participants, the activities conducted in the two learning environments, the pretest and posttest materials, and the procedures followed for gathering and scoring the quantitative data.

CASE STUDY DESIGN

Participants

The participants in the present study were 104 learners in eleven first-semester beginning Spanish classes at the University of Texas at Austin during the fall semester of 1997. When the learners registered for the course, they did not

know whether they would be enrolled in a computer-assisted section or in a classroom-only section. The syllabus for all first-semester Spanish learners required the use of the same course materials, and covered the same grammar and vocabulary. The difference was that the computer-assisted sections worked in the computer lab two days a week without their instructor, in addition to classroom attendance three days a week with their instructor. The classroom-only sections attended class five days a week with their instructor.

Fifty learners from six computer-assisted sections and 54 learners from five classroom-only sections participated in the study. Learners were chosen based on their willingness to participate, and on their score on a pretest fill-in-the-blank verb exercise (Appendix A) that assessed learner ability to produce conjugated verb forms correctly. In order to be included in the study, learners could not know more than five of the thirteen verb forms that appeared in Chapters 3 to 7 of their textbook *Puntos de partida* (fifth edition), because these forms had not been presented in class at the point in the semester at which the pretest was administered. Previous high school experience in Spanish did not disqualify subjects from participating in the study because prior Spanish study does not necessarily mean that learners remember what they learned at the time.

All potential participants had to complete a background questionnaire (Appendices B and C) that asked for the following information: name; native language; language spoken at home; amount of high school Spanish; any family member(s) who speak(s) Spanish; other foreign languages studied; study abroad experience (how long, where); and travel abroad (how long, where). The Computer-Assisted learners' background questionnaire (Appendix B) solicited

some additional information: computer experience (how much, in what capacity—game playing, word processing, etc.); and typing skills (how the learners rate their typing skills—poor, average, good, excellent). The results of the background questionnaires are as follows.

The majority of learners spoke English as their native language, and spoke English at home, as shown in Table 3.1. Six of the Classroom-Only learners considered Fanti (1), Taiwanese (1), Cambodian (1), Bengali (1), Vietnamese (1), or Indonesian (1), as their native language. In addition to speaking English at home, a few learners also spoke Urdu, Vietnamese, Singalese, Cambodian, or Bengali. Four Classroom-Only learners did not speak English at home, but rather either Fanti, Taiwanese, Vietnamese, or Indonesian. The various languages spoken at home, other than English, by both Computer-Assisted and Classroom-Only learners are summarized in Table 3.2.

Table 3.1: English as learners' native language and language spoken at home

Group	**English as native language**	**English spoken at home**
Computer-Assisted (N = 50)	50	50
Classroom-Only (N = 54)	48	50

Table 3.2: Languages, other than English, spoken at home

Language	**Computer-Assisted Group (N = 50)**	**Classroom-Only Group (N = 54)**
Urdu	1	1
Vietnamese	2	1
Singalese	1	0
Cambodian	0	1
Bengali	0	1
Fanti	0	1
Taiwanese	0	1
Indonesian	0	1

A few learners had family members that spoke Spanish. Three Computer-Assisted learners' mothers spoke Spanish (one as a native, two as non-native Spanish teachers), two fathers spoke Spanish as non-native Spanish teachers, and one learner's grandmother spoke Spanish. The mother of one Classroom-Only learner spoke Spanish as a native speaker, and one father spoke Spanish as a non-native Spanish teacher.[4] This information is summarized in Table 3.3.

[4] These learners were not excluded from the present study because none of them grew up speaking or hearing Spanish on a daily basis. Further, they met the same criteria for participation in the study as the other participating learners had (not knowing more than 5 of 13 verb forms from Chapters 3 to 7 in their textbook).

Table 3.3: Family members who speak Spanish

Family member	**Computer-Assisted Group (N = 50)**	**Classroom-Only Group (N = 54)**
NS mother	1	1
NS grandmother	1	0
NNS mother	2	0
NNS father	2	1

The majority of learners in both groups had never participated in a study abroad program. Three of the Computer-Assisted learners had studied in a foreign country (one in Mexico for three weeks, one in Guatemala for two weeks,[5] and one in Singapore and the Philippines for one year), and four Classroom-Only learners had studied in a foreign country (one in Ghana for one year, one in England for four weeks, one in Canada for four weeks, and one in Bangladesh for just over one year). Slightly more than half of the learners in each of the groups had traveled to a foreign country (i.e., Mexico, the Caribbean, Europe, the Philippines, and the Far East), spending about a one week vacation in the foreign country. Study and travel abroad information for both groups is summarized in Table 3.4.

[5]These two learners were not excluded from the present study because they met the same qualifications for participation as the other participating learners had (not knowing more than 5 of 13 verb forms from Chapters 3 to 7 in their textbook). The student who studied in Mexico for 3 weeks scored 50% on the pretest discrete-item verb exercise and 5/13 (38%) on verbs from Chapters 3 to 7, while the student who studied in Guatemala for 2 weeks scored 20% and 0/13. Although these learners were in the Spanish speaking countries for a short period, it would be unlikely that they spoke Spanish the entire time. Their pretest discrete-item verb exercise scores seemed to indicate that they did not have an unfair advantage due to their study abroad experience.

Table 3.4: Study and travel abroad experience

Experience	**Computer-Assisted Group (N = 50)**	**Classroom-Only Group (N = 54)**
Study abroad	3	4
Travel abroad	29	34
No prior experience	21	20

The majority of Computer-Assisted learners had previous high school Spanish experience, while the majority of Classroom-Only learners did not because two of the five sections included in the Classroom-Only group were comprised of *true beginners*. In order to be in a *true beginner* course, students could not have studied Spanish in high school,[6] although they could have studied another foreign language. The majority of learners in both groups, however, had prior high school foreign language experience. Only two learners in each group had not had any foreign language experience in high school. High school Spanish experience for both groups is summarized in Table 3.5, and high school foreign language experience for both groups is summarized in Table 3.6.

[6]It should be noted that, if students have studied Spanish in high school, it does not automatically mean that they have retained that knowledge at the college level. Therefore, true beginners are not necessarily at a disadvantage.

Table 3.5: High school Spanish experience

Total Experience	**Computer-Assisted Group (N = 50)**	**Classroom-Only Group (N = 54)**
No Spanish[7]	14	37
1 year	4	0
2 years	26	15
3 years	6	2

Table 3.6: High school foreign language experience

Language	**Computer-Assisted Group (N = 50)**	**Classroom-Only Group (N = 54)**
Spanish	36	17
French	6	16
Latin	3	12
German	3	5
Russian	0	1
Japanese	0	1
None	2	2

Most of learners in both groups stated the same reason for studying Spanish as opposed to another foreign language. They thought that Spanish would be the most useful and practical language to know since they planned to live and work in the Southwest. Some learners in each group said they were studying Spanish because they had previous high school Spanish experience that would make it easier to learn it. A few learners stated an interest or desire to learn

[7] The majority of the Classroom-Only learners did not have high school Spanish experience, which does not mean they did not have any high school foreign language experience. Table 3.6 illustrates that the majority of Classroom-Only learners had studied a foreign language other than Spanish in high school.

Spanish as their reason for studying it. This information is summarized in Table 3.7.

Table 3.7: Reasons for studying Spanish rather than another foreign language

Reason for studying Spanish	**Computer-Assisted Group (N = 50)**	**Classroom-Only Group (N = 54)**
Practical / Useful	39	47
Prior high school experience	8	4
Interest / Desire	3	3

The Computer-Assisted learners had a varied amount of computer experience, from less than six months to more than three years. All of the learners had experience using the computer for the purpose of word processing, and most had experience with e-mail, the Internet, and game playing. These results are summarized in Tables 3.8 and 3.9.

Table 3.8: Computer experience for Computer-Assisted learners

Total Experience	**Computer-Assisted Group (N = 50)**
0 - 6 months	10
6 months - 1 year	9
2 years	14
3 years	10
3+ years	7

Table 3.9: Type of computer experience for Computer-Assisted learners

Type of experience	**Computer-Assisted Group (N = 50)**
Word processor	50
E-mail	46
Internet	45
Games	48

The Computer-Assisted learners were also asked to rate their typing skills because of the possibility that poor typing skills would be a serious disadvantage when they were required to type their compositions in the computer lab. The majority of the Computer-Assisted learners rated their typing skills as good or average, while two learners rated their typing skills as excellent, and one rated his skills as poor. None of the Computer-Assisted learners, however, reported to their instructors that they did not have sufficient time to complete the compositions in the computer lab.

Description of Coursework Activities

All first-semester Spanish learners participated in classroom interaction that included instructor-led exercises and group- and pair-activities. The Classroom-Only group attended classroom instruction five days per week while the Computer-Assisted group attended three days per week. During the two days of computer lab attendance, the Computer-Assisted learners completed several types of activities: Spanish pronunciation tutor, vocabulary exercises, listening practice, reading assignments (*Lecturas*), and self-paced grammar lessons provided by *Spanish Partner* (a program by McGraw-Hill Publishers). The nature

of some of the computer lab activities could be considered implicit because they provided a focus on meaning; for example, vocabulary practice, listening comprehension practice, and reading selections. There were also computer lab activities that were explicit in nature because they provided a focus on form via *Spanish Partner* grammar exercises. Learners did not engage in every type of computer exercise each time they went to the lab. Computer lab activities were coordinated with their in-class syllabus to correspond to the chapter material that was being covered at a particular point during the semester. The computer exercises were a required part of the syllabus for the Computer-Assisted sections; they were not used for the sole purposes of this study. The Classroom-Only learners participated in similar activities in print-based format during class time.

Pronunciation

During computer lab sessions, the Computer-Assisted group could utilize the Spanish pronunciation tutor, which provided learners with the proper pronunciation of Spanish consonants, vowels, diphthongs, stress, linking, and intonation. Learners had the opportunity to listen to correct pronunciation and then do exercises to test their listening skills. For example, in an exercise with the Spanish alphabet, learners first listened to groups of letters being pronounced, then practiced by typing a word as it was spelled. The program checked the typed word for mistakes, showed the learners the location of any errors, and pronounced the word correctly in Spanish. Learners could also record themselves to compare their pronunciation with that of a native speaker, although it was not a required task in the syllabus.

The Classroom-Only group participated in pronunciation exercises from the textbook that corresponded with the chapter they were currently working on. The activities were instructor-led whereby the instructor would verbally demonstrate the pronunciation of Spanish consonants, vowels, diphthongs, stress, linking, and intonation. Learners would then repeat what they heard as a group or individually, and the instructor would provide corrective feedback.

Vocabulary

Computer-assisted vocabulary practice exercises consisted of categories of vocabulary words that pertained to a particular chapter in the textbook. Learners typed in five vocabulary words that they associated with each category. For example, one category was *los colores* 'the colors'. Learners could type *blanco, negro, azul, rojo, amarillo* 'white, black, blue, red, yellow', and then click the **Check Answer** button. All of the possible colors from the chapter that the learners could have written as their answers were then listed. After completing all of the vocabulary categories for that chapter, learners had the option of exiting the program, or clicking the **Start Again** button to go through the same exercises for additional practice.

The Classroom-Only learners completed print-based vocabulary practice exercises from their textbook or workbook. Some of the exercises involved written activities in which learners worked individually or with a partner (e.g., complete sentences with the correct color from a given list). Other activities were oral exercises that learners completed with a partner (e.g., learners describe the

color of the clothing classmates are wearing). Learners could check their answers from the back of their workbook or could consult with their instructor.

Listening

The Computer-Assisted learners engaged in listening practice in the computer lab that was comprised of oral questions and possible responses that pertained to the grammar and vocabulary of a particular chapter, and were designed to help learners prepare for the same type of questions asked in person during class days. There were twelve questions per chapter, each with two possible responses. Different native speaker voices were used for each of the questions and each of the responses. Learners had the option of seeing the questions written in Spanish and in English. For example, from the chapter that included reflexive verbs, learners clicked the question *"¿Siempre te acuestas tarde los viernes y los sábados?"* 'Do you always go to bed late on Fridays and Saturdays?'. Ideally, the learners would think of a logical response, and then click the two possible answers given to hear if their answer was indeed similar. The two possible responses for this question were *"No, me acuesto temprano"* 'No, I go to bed early', and *"Sí, siempre me acuesto tarde los viernes y los sábados"* 'Yes, I always go to bed late on Fridays and Saturdays'.

Listening practice activities for the Classroom-Only learners were comprised of the same twelve questions that corresponded to each chapter as those used by the Computer-Assisted sections. The activity was instructor-facilitated rather than computer-facilitated. Instructors asked the questions and then called on individual learners to respond.

Reading

Reading practice for the Computer-Assisted group consisted of Spanish texts selected from the textbook *Puntos de partida,* fifth edition, reading comprehension activities, and an exit quiz to test comprehension. Learners read a short introduction written in English to the reading before actually seeing the text in Spanish. The introduction to the text *Las universidades hispánicas* 'Hispanic Universities', for example, oriented the learners to the content of the selection, which was about the differences between North American and Latin American universities. Learners could read the text in Spanish to themselves, or listen and read along as a native speaker read the selection aloud in Spanish. After reading the text as many times as they wished, the learners completed content-based interactive exercises for which directions were given in English. One activity required learners to drag and drop underlined vocabulary items into boxes labeled *Noun*, *Verb*, or *Adjective*. When the word was dropped into the correct box, the learner saw other parts of speech that were derived from the word. In another activity, learners read statements in Spanish and then clicked on the correct response. Responses were corrected by the computer after completion of the exercise. Before the learners could exit the reading program, they were required to take a short, ungraded quiz to test how well they had understood the passage. These quizzes were composed of four brief multiple choice or true-false questions. Learners selected their answers and then checked them after they had finished the quiz.

Classroom-Only learners were assigned the same reading texts as the Computer-Assisted group. The Classroom-Only group completed pre-reading activities in class then read the text as a homework assignment. The next day the learners did post-reading exercises in class and took a short quiz on the reading selection.

Grammar

First-semester Spanish students in both the classroom-only sections and the computer-assisted sections completed grammar activities. Learners practiced with numbers, definite and indefinite articles, demonstrative adjectives, comparisons, negative and indefinite words, commands, and verb conjugation drills. The Classroom-Only learners participated in the aforementioned activities via traditional textbook and workbook exercises they completed in class or as homework. The Computer-Assisted group completed such exercises in the computer lab via *Spanish Partner*, a program by McGraw-Hill Publishers. The present study observes what effects, if any, computer-assisted verb activities might have on learners' morphological production. Therefore, the *Spanish Partner* verb exercises are the only computer-based grammar activities that are described in detail in this section.

Verb exercises provided by *Spanish Partner* included all of the different types of verbs covered during the semester: regular *-ar*, *-er*, *-ir* verbs; irregular verbs; stem-changing verbs; verbs with an irregular *yo* 'I' form; reflexive verbs; *ser* versus *estar*; and *saber* versus *conocer*. Learners practiced with several types of verb exercises (multiple choice, substitution, sentence completion, and

paragraph completion), some of which were mechanical in nature and some were more meaningful (cf. DeKeyser, 1998).

Multiple choice verb exercises began with a review of the verb endings for regular *-ar*, *-er*, or *-ir* verbs, depending on the chapter. This activity gave learners the opportunity to recognize and choose the correct verb form for various infinitives relevant to the subject given. Learners were also provided with the meaning of the infinitive at the beginning of each section of the exercise. Therefore, the nature of this type of exercise is considered mechanical because learners were required to recognize correct verb forms only, without attending to meaning, as illustrated in example (3.1).

(3.1) Aprender—to learn

Los estudiantes _____ mucho en esta clase.

a. aprende b. aprendes c. aprenden

'*The students _____ a lot in this class.*

a. (he) learns *b. (you) learn* *c. (they) learn'*

(3rd person singular) *(2nd person singular)* *(3rd person plural)*

Substitution verb exercises also began with a review of the verb endings, and provided verb conjugation practice. Learners were given the first answer, and then substituted the correct form of the same verb for each new subject given. This type of exercise is also mechanical, but differs from that shown in example (3.1) because it required learners to supply the correct form, not just recognize it, as in example (3.2).

(3.2) Yo contesto todas las preguntas en español.

'I answer all of the questions in Spanish.'

Learners then filled in the blanks with the correct form of contestar '*to answer*':

Los estudiantes _____ todas las preguntas en español.

'The students _____ all of the questions in Spanish.'

Ana y yo _____ todas las preguntas en español.

'Ana and I _____ all of the questions in Spanish.'

Sentence completion verb exercises provided verb conjugation and vocabulary practice. This type of activity is more meaningful than those illustrated by examples (3.1) and (3.2), in that learners completed sentences with the correct form of the verb for the subject given, as suggested by the context (meaning) of the sentence. A list of verbs in Spanish to choose from was provided [glosses were not provided].

(3.3) regresar ['*to return'*], fumar ['*to smoke*'], hablar ['*to speak*'], pagar ['*to pay'*]

Yo _____ muy poco español.

'I _____ very little Spanish.'

Los estudiantes _____ la matrícula.

'The students _____ tuition.'

¿A qué hora _____ tú a casa?

'At what time do you _____ home?'

Me gusta _____, pero no tengo tabaco.

'I like _____, but I don't have any tobacco.'

Paragraph completion verb exercises required learners to complete the paragraph with the correct form of the verb, given in parentheses, for different subjects. The following is an example with *-ar* verbs, and is mechanical in nature

because learners can supply the correct form by recognizing the appropriate subject but without knowing what the meaning is. There is no vocabulary practice in this type of activity.

(3.4) Mi amiga Pili es de Argentina. Ella siempre me _____ (hablar) en español y yo le _____ (contestar) en inglés. Así, ella y yo _____ (practicar). Todos los miércoles yo _____ (cenar) en casa de sus padres porque ellos _____ (cocinar) comida de su país.

'My friend Pili is from Argentina. She always _____ (to speak) to me in Spanish and I _____ (to answer) her in English. Thus, she and I _____ (practice). Every Wednesday I _____ (to have dinner) at her parents' house because they _____ (to cook) food from their country.'

Another type of paragraph completion verb exercise provided both verb conjugation and vocabulary practice, and was thus meaningful in nature because learners were required to process both form and meaning and not just recognize the correct form. Learners replaced the English translation given in parentheses with the correct Spanish verb form, as in example (3.5).

(3.5) (I'm taking) _____ cinco materias, y la que más me gusta es español. Todos los días (I study) _____ con Jaime y Luisa. Nosotros (we practice) ____ con Micaela, una estudiante de Buenos Aires. Pero ella (speaks) ____ español más rápido que nosotros.

'*(I'm taking) _____ five courses, and the one that I like the most is Spanish. Everyday (I study) _____ with Jaime and Luisa. We (we practice) _____ vocabulary and pronunciation and (we speak) _____ with Micaela,*

a student from Buenos Aires. But she (speaks) _____ Spanish more rapidly than we do.'

Upon completion of each type of the aforementioned verb exercises, learners were provided with a summary of their correct and incorrect responses. Learners also received immediate feedback after every response that they gave. For incorrect answers, learners received a feedback message with the reason the answer was incorrect. They could try again, or they could select **Skip** from the menu and the program would give them the correct answer. Example (3.6) illustrates typical messages learners received after every response.

(3.6) "*¡Excelente!* Yes, this is the way to express 'you answer' or 'you are answering' in Spanish."

"*¡Bien!* You have the correct verb and the correct ending."

"*¡Bravo!* Perfect conjugation of the *nosotros* form."

"*¡Qué lástima!* You need the *yo* form of the verb."

"*Un momento*. You need the second person familiar form of the verb in the present tense. The correct ending is *-es*."

"You forgot the E>IE stem change."

Pretest Materials and Data Collection

Pretesting for both groups took place during the fourth and fifth weeks of the semester. During the fourth week, the researcher visited each of the participating Computer-Assisted classes. The researcher first provided the learners with an overview of the study, then asked participants to sign a letter of agreement. Learners were assured that their participation was strictly voluntary, in

no way affected their grade, and that they could drop out of the study at any time. The researcher then administered the background questionnaire (Appendix B) and the discrete-item verb test (Appendix A), which learners were timed to finish in five minutes. The discrete-item verb test was comprised of twenty autonomous fill-in-the blank sentences that gave the subject and the infinitive form of the verb. Seven verbs from Chapters One and Two, and thirteen verbs from Chapters Three through Seven of the class textbook, were included in the exercise.

During the fourth week of the semester the participating Classroom-Only sections met for one day during regular class time in an audio-laboratory rather than in their usual classroom. The researcher first provided the Classroom-Only participants with an overview of the study, then asked that those who had agreed to participate sign a letter of agreement. The Classroom-Only learners, like the Computer-Assisted learners, were assured that their participation was strictly voluntary, in no way affected their grade, and that they could drop out of the study at any time. The researcher then administered the background questionnaire (Appendix C) and the discrete-item verb test (Appendix A), which learners were timed to finish in five minutes.

There was one oral pretest, which was a description of a picture. The picture was a drawing of activities typically found at a party: a musical group playing instruments, people dancing, people talking, a table of food and drinks. All of the people in the picture had a name written above or next to them so that the learners could use a name when describing the people, or any actions that they were doing. The appearances of the people were varied, as well as the actions that were taking place, so there was a variety of things to describe. For example, a

woman named Yolanda is holding a wine glass and speaking with a woman named Elvira, Juan Carlos and Conchi are dancing, Laura is thinking about smoking a cigarette, Roberto is serving himself some food, and a very tall woman named Clara is talking to a short man named Miguel.

Oral pretesting for the Computer-Assisted learners took place the fourth week of the semester during their regularly scheduled class time in the computer lab. The oral pretest for the Computer-Assisted learners was their first Communicative Goals Recording (CGR)—a graded activity done in the computer lab as part of the class syllabus. The learners described the aforementioned picture of a party scene that appeared on the computer screen, using as much grammar and vocabulary as they could. Learners were directed to describe the picture in as much detail as possible, and to include actions that were taking place (e.g., people talking, dancing, or eating), physical descriptions of the people in the picture, and the likes and dislikes of these people. The learners were required to say as much as possible about the picture for a total of 45 seconds. Because this exercise was part of the class syllabus and was graded, the learners could record themselves more than once until they were satisfied with their recording. The researcher later accessed these recordings from the computer lab in order to obtain the necessary oral data for the study.

Oral pretesting for the Classroom-Only classes took place in the audio-laboratory immediately after the administration of the background questionnaire (Appendix C) and the discrete-item verb test (Appendix A), following procedures similar to those used for pretesting the Computer-Assisted participants. Instead of seeing the picture on the computer screen, however, the Classroom-Only learners

were each given a copy of the same picture of the party scene that the Computer-Assisted learners described. The Classroom-Only learners were given the same directions as the Computer-Assisted learners to describe the picture in as much detail as they possibly could for a total of 45 seconds. Their recordings were not graded, but were used solely for the purposes of the study. The Classroom-Only learners were recorded twice for practice, then the third recording was the one used as their oral pretest. The researcher collected the audiotapes immediately after the third recording.

There were two written pretests, including the previously described discrete-item verb test (Appendix A) and a written composition (Appendix D). The written composition, authored by the Lower Division Coordinator of the Spanish department, was a required part of the class syllabus for all first-semester Spanish learners. The composition required the learners to write a letter home to their mothers, telling her about their life as students at the University of Texas at Austin. They described as much as possible in the present tense, including details such as their studies, descriptions of their classes, professors, and roommates, where they lived, etc.

The in-class composition was given during the fifth week of the semester as a required part of the syllabus for all first-semester Spanish classes. The Computer-Assisted learners wrote their compositions in the computer lab. After reading instructions given on the screen, they typed their compositions and printed them out in the lab to turn in to their instructor. The same procedures were followed for the Classroom-Only learners, except that they wrote their compositions by hand in the classroom following instructions given on paper,

instead of on a computer screen. Both groups of learners were given approximately thirty minutes to write their compositions. The average length of the compositions was about half a page, single-spaced and typed on the computer, or one to two pages hand-written (writing on one side of the paper, every other line). The instructors made copies of the compositions before grading them and gave them to the researcher.

Posttest Materials and Data Collection

Oral posttesting for both groups took place during the fourteenth week of the semester. The final audiotaped oral interview (Appendices E and F), a required part of the syllabus for all first-semester Spanish students, served as the oral posttest. The final interview was comprehensive of the grammar and vocabulary covered during the semester. The format differed slightly for the two groups due to a miscommunication between the supervisor of the Computer-Assisted sections and the supervisor of the Classroom-Only sections. The format included warm-up questions, personal questions, a picture description (for the Classroom-Only learners), and a role-play situation. Computer-Assisted learners did the role-play with a partner from class, while Classroom-Only learners did their role-play with their instructor. All of the learners were informed of this format prior to the actual interview, and had the opportunity to practice during class time. Learners practiced sample questions and three role-play situations during the week prior to the interview. They were not informed of which role-play would be part of their interview, nor did they know which questions they would be asked until the actual interview.

During the week of the interview, both Computer-Assisted and Classroom-Only learners met individually with their instructors, who conducted and recorded the interview on audiotape. After grading the interviews, the instructors then turned the tapes over to the researcher. The oral interviews included two questions with the preterit verb tense; however, this grammatical element was not included in the data. The present study considered only present tense verb production, because learners focused on the present tense for the majority of the semester, and because the preterit aspect was not introduced until the last two weeks of the semester it was not included in the pretest.

There were two written posttests, the same discrete-item verb test used for the pretest (Appendix A), and the written composition given on the final exam (Appendix G). The first written posttest, the discrete-item verb test, was given during the fifteenth week of the semester, following the same procedures used for the first written pretest data collection. The researcher visited each of the participating classes, both Computer-Assisted and Classroom-Only, to administer the discrete-item verb test that was timed for five minutes.

The second written posttest, the final exam composition (Appendix G), took place during the regularly scheduled university final exam period. Both groups took the same written final exam given at the same time. The composition, in which learners wrote a letter to the director of a foreign exchange student program regarding a Costa Rican student who would be living with their family in the Spring, elicited grammar and vocabulary covered throughout the semester. In their letters, learners supplied information about themselves and their families, described Austin and compared it to other Texas cities, told the director about the

weather in Austin, described some of the forms of entertainment the city has to offer, and included what interesting things they, as students, had done this year. Learners were to use formal commands to tell the director to write back with any questions, and to request what type of clothing the Costa Rican student needed to bring. Neither formal commands, nor the preterit form of the past tense, were included in the data for the purposes of the present study because only present tense verb production was considered, as previously discussed with respect to the oral posttest. The researcher provided the instructors with a list of those learners who were participating in the study. The instructors then made copies of those learners' final exam compositions and gave them to the researcher.

Procedures for Scoring the Pretest and Posttest Data

In order to score the oral pretest and posttest data, the researcher first listened to each audiotaped recording. Every time a student produced a verb form, the researcher wrote down that form, noted if it was incorrect, and wrote what the correct verb form should have been. The researcher then counted the total number of verb forms, and the total number of correct forms that each learner produced. The total number of correct forms was then divided by the total number of verb forms produced in order to obtain a percentage score. For example, if a learner produced a total of 20 verb forms, of which 15 were correct, then that learner's score was 75. These percentage scores were used in the statistical analysis conducted to answer research question 2 with respect to accurate oral verb production. Results from the statistical analysis of the pretest data and posttest data are discussed in Chapter 4.

The researcher also made note of any occurrences of self-initiated learner corrections in the oral data, and whether those corrections were indeed the correct verb forms. Correcting the wrong verb form to the right form was not counted as an error. Correcting the right form of the verb to the wrong form, and correcting the wrong form of the verb to another incorrect form, were counted as errors. The researcher then tallied all incidents of self-initiated corrections (incorrect verb form to the correct form, correct verb form to an incorrect form, and incorrect verb form to another incorrect form). The total number of self-initiated verb form corrections was used to answer research question 3 regarding learners' self-initiated grammatical corrections. These results are discussed in Chapter 4.

To score the first written pretest and posttest data from the discrete-item verb test, the researcher counted the number of correct verb forms produced out of a total of 20 forms. This score was then converted to a percentage. For example, if a learner produced 18 correctly conjugated forms, then that learner's score was 90.

In order to score the second written pretest and posttest data from the written compositions, the researcher first read each composition, marked all present tense verb forms that were produced, and noted any incorrect forms. The researcher then counted the total number of verb forms produced, and the total number of correct verb forms. The total number of correct forms was divided by the total number of verb forms that were produced in order to obtain a percentage score. For example, if a learner produced a total of 26 verb forms, of which 18 were correct, then that learner's score was 69. The percentage scores from the two written pretests and posttests were used in the statistical analysis conducted to answer research question 2 with respect to accurate written verb production. The

results of the statistical analysis of the pretest and posttest data are discussed in Chapter 4.

Learners made several types of errors in both the oral and written data. Any mistakes with the form of the verb itself were counted as incorrect and affected the learners' percentage scores on the oral and written pretests and posttests. Errors of pronouns or vocabulary were not counted if the verb form itself was correct, and therefore did not affect the learners' percentage scores on the oral and written test measures. Self-initiated corrections in the oral data did not count as errors, assuming that the correction resulted in the correct form of the verb. Examples (3.7) to (3.14) illustrate mistakes that affected the learners' scores:

(3.7) Subject-verb agreement

Juan Carlos y Conchi *baila.

*'Juan Carlos and Conchi *dance (3rd person singular).'*

Laura *deseo fumar.

'*Laura *want (1st person singular) to smoke.'*

(3.8) Errors of the verb ending (e.g., using an -ar ending for an -er or -ir verb)[8]

Las personas *beban vino.

'*The people *drink (-ar verb ending instead of -er verb ending) wine.*'

Nosotros *asistemos a misa.

*'We *attend (-er verb ending instead of -ir verb ending) mass.*'

[8]This type of mistake could also be considered as an error in verb tense. The learners in the present study, however, had been presented only the present tense until the last two weeks of the semester when the preterit and formal commands were introduced. It is difficult to know exactly how to classify this type of mistake. Because the present study is concerned with the present tense only, these mistakes were considered as errors in the verb ending, rather than tense or aspect errors.

(3.9) Conjugated verb form followed by a conjugated verb form

Clara quiere *baila en la fiesta.

*'Clara wants *dances (3rd person singular rather than the infinitive form) at the party.*'

Tengo *va.

'*I have *goes (3rd person singular rather than the infinitive form).*'

(3.10) Leaving the verb as an infinitive

Jaime *fumar.

'*Jaime *to smoke.*'

Yo *despertarse y *estudiar todo el día.

'*I *to wake up and *to study all day.*'

(3.11) Lack of verb

*Clara alta.

'**Clara tall.*'

*Roberto mucha comida.

'**Roberto a lot of food.*'

(3.12) Spelling

Yo no *conoco (conozco) al presidente.

'*I don't *know the president.*'

*Jugo (Juego) tenis con mis amigos.

*'I *play tennis with my friends.*'

(3.13) Self-initiated corrections in the oral data in which the learner produces the correct verb form and then produces an incorrect verb form

Juan Carlos y Conchi les gusta *gustan bailar.

'*Juan Carlos and Conchi like (3rd person singular) *like (3rd person plural) to dance.*'[9]

Juan Carlos y Conchi bailan *bailas.

*'Juan Carlos and Conchi dance (3rd person plural) *dance (2nd person singular).'*

(3.14) Self-initiated corrections in the oral data in which the learner produces an incorrect verb form and then produces another incorrect verb form

Yo *mira *mirar la televisión.

*'I *watches (3rd person singular) *to watch television.'*

Yo *duchar *ducha en la mañana.

*'I *to shower *shower (3rd person singular) in the morning.*'[10]

Examples (3.15) to (3.17) illustrate mistakes that did not affect the learners' scores:

(3.15) Pronoun errors (lack of pronoun or incorrect pronoun)

Laura *se gusta fumar.

'*Laura *likes (reflexive pronoun rather than indirect object pronoun) to smoke.*'

Roberto *gusta comer.

*'Robert *likes (lack of indirect object pronoun) to eat.*'

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[9]Conjugations of the verb gustar 'to like' do not agree with the grammatical subject, but rather with the direct object, or that which is liked. In this example, therefore, the form gusta should agree with the infinitive bailar 'to dance', which is considered singular, and not with Juan Carlos and Conchi, the grammatical subject that is plural.

[10]In this example the learner's response also lacked the obligatory reflexive pronoun. The present study, however, considered only verb production. Therefore, the lack of the reflexive pronoun was not counted as an error.

(3.16) Vocabulary

Yolanda *es (tiene) veinte años.

'*Yolanda is twenty years old.*'

(3.17) Self-initiated corrections in the oral data in which the learner produces an incorrect verb form and then produces the correct verb form

Sonia *hablan habla con Paco y Rodolfo.

*'Sonia *talk (3rd person plural) talks with Paco and Rodolfo.*'

Clara *quieres quiere bailar.

'*Clara *want (2nd person singular) wants to dance.*'

SUMMARY

The present case study compares two different groups of learners given that the first-semester Spanish course was presented as two iterations of the same course at that time. Therefore, the learning environment and its pursuant methodology is a dominant distinction that differentiates the two groups. One group of learners attended class with their instructor three days per week and participated in various computer-based activities in the computer lab the other two days. The other group of learners attended class with their instructor five days per week. The Computer-Assisted learners completed several activities in electronic format, including reading assignments, grammar exercises, and listening practice, using a word processor to write their in-class compositions. The Classroom-Only learners participated in the same type of activities via a different medium. They completed reading assignments as homework, print-based grammar exercises from their textbook and accompanying workbook, and wrote the in-class

compositions by hand during class time. Listening practice also took place in class and was facilitated by their instructor. Both groups experienced classroom interaction that included instructor-led activities and group- and pair-work; however, the Computer-Assisted learners did not have such interaction in the computer lab the two days they attended.

The delivery and format of the pretest and posttest measures were different for the two groups. The Computer-Assisted learners were required to complete the pretest oral recording of the picture description as a graded assignment from the course syllabus, whereas it was used for study purposes only in the case of the Classroom-Only learners. The Computer-Assisted group typed one of the written pretests—the in-class composition—in the computer lab while the Classroom-Only group wrote their composition by hand in the classroom. The format of the oral posttest—the final oral interview—was somewhat different for each group due to a miscommunication between the course supervisors. Specifically, the Classroom-Only learners had to describe a picture while the Computer-Assisted group did not, and their role-play was with their instructor whereas the Computer-Assisted learners did theirs with a classmate.

In addition to the aforementioned between-group differences, the Computer-Assisted learners and the Classroom-Only learners shared some characteristics. For example, the majority of the learners spoke English as their first language and as the language spoken at home. Of the 104 learners, only four (two Computer-Assisted and two Classroom-Only) had never studied a foreign language in high school. The experience learners had regarding study and travel abroad was also similar. Further, the majority of the Computer-Assisted learners

had the same amount of computer experience and computer skills. Another attribute the learners shared was the subject of study: first-semester Spanish for which the course content was the same. All of the learners used the same textbook (*Puntos de Partida*, 4th edition), studied the same course material (grammar and vocabulary), completed identical reading selections, and wrote compositions on the same topics.

One learner characteristic that the groups did not share, however, was the degree of prior Spanish experience. Almost all of the Computer-Assisted learners had studied Spanish in high school, while the majority of the Classroom-Only learners had not. The Classroom-Only group included true beginners who had not studied Spanish at the secondary level; however, all but two had studied another foreign language in high school.

The present case study acknowledges that, because the two groups differ in the manners heretofore described, they cannot be compared quantitatively with an experimental study design. The learners, however, do share enough in common to be compared and described qualitatively as the participants in a case study. Chapter 4, Quantitative Analysis of Results, presents the statistical analysis of the pretest and posttest data to answer research question 2, and presents a quantitative analysis of the data to answer research question 3.

CHAPTER FOUR

Quantitative Analysis of Results

A pretest and a posttest were administered to the Computer-Assisted and the Classroom-Only learners. Due to the between-group differences acknowledged in Chapter 3, pretest and posttest results are exploratory and limited to this group of learners and body of data. The study utilizes the results of the statistical analysis of the pretest and posttest data to make qualitative observations of learners' verb production at the beginning and end of the study. The following sections present a statistical analysis of the data in order to answer research question 2, and a quantitative analysis of learners' oral production in order to answer research question 3. Quantitative and qualitative observations based upon study findings are discussed in Chapter 5, Conclusions.

STATISTICAL ANALYSIS OF THE PRETEST DATA

Oral Picture Description

An Analysis of Variance (ANOVA) was run on the oral pretest data. The pretest mean score was 89 for the Computer-Assisted group, and 77 for the Classroom-Only group. The ANOVA p-value for this group effect was 0.001, $F(1, 102) = 11.72$, showing that the groups' oral pretest scores differed significantly. Results indicate that the Computer-Assisted learners' oral verb production performance was different from that of the Classroom-Only learners at the beginning of the semester. Specifically, the Computer-Assisted learners

produced statistically more accurate verb forms on the oral pretest. Although the study participants do not represent a uniform subject population due to the previously discussed between-group differences, their oral verb production performance is mathematically equalized in order to compare it again at the end of the semester. An Analysis of Covariance (ANCOVA) is run on the posttest data to mathematically adjust for differences in pretest scores. This statistical measure allows us to compare oral verb production performance at the end of the semester via posttest scores because ANCOVA mathematically accounts for any differences encountered in the pretest scores.

Discrete-Item Verb Test

The ANOVA was run on the discrete-item verb test pretest data. The pretest mean score was 40 for the Computer-Assisted group, and 36 for the Classroom-Only group. The ANOVA p-value for this group effect was 0.16, $F(1, 102) = 2.02$, which shows that the groups' discrete-item verb test pretest scores were statistically non-significant. Results indicate that the verb production performance of the two groups on the discrete-item verb test is similar enough to compare on the posttest without adjusting for pretest differences. ANCOVA, however, was run on the posttest scores to be consistent with the statistical analysis of the oral posttest data.

Written Composition

ANOVA was run on the written composition pretest data. The pretest mean score was 91 for the Computer-Assisted group, and 91 for the Classroom-Only group. The ANOVA p-value for this group effect was 0.89, $F(1, 102) = .02$,

showing that the groups' written composition pretest scores were statistically non-significant. Results indicate that the two groups' verb production performance on the written composition is similar enough to compare on the posttest without adjusting for pretest differences. ANCOVA, however, was run on the posttest scores to maintain consistency of statistical measures. The pretest results discussed in the preceding three sections are summarized in Table 4.1.

Table 4.1: Summary of pretest results

Pretest	**Computer-Assisted Group (N=50)**	**Classroom-Only Group (N=54)**	**p-value (p < .01)**
Oral	89	77	0.001*
Discrete-item verb test	40	36	0.16
Written Composition	91	91	0.89

*significant

Statistical analysis of the pretest data indicated that the learners' written verb production performance was similar at the beginning of the semester. Analysis of the oral pretest data did result in significant statistical differences, which indicates that the learners' oral verb production performance was not similar at the beginning of the semester. The present case study recognizes that the groups are too different to compare in a quantitative experimental study. The learners can be compared qualitatively as the participants in a case study whereby quantitative data is taken into account when describing learner verb production performance. That stated, their oral verb production performance was equalized by mathematically adjusting for pretest differences in order to compare their

performance again at the end of the semester via statistical analysis of the posttest data discussed in the next section.

STATISTICAL ANALYSIS OF THE POSTTEST DATA

Final Oral Interview

In order to answer research question 2 regarding whether participation in computer-assisted verb exercises has any effect on learners' ability to notice and focus attention on Spanish verb forms, thereby helping to learn the forms as shown by accurate use of verb structures in oral production, ANCOVA was run on the posttest data from the final oral interview. After adjusting for the pretest scores, the posttest mean score was 86 for the Computer-Assisted group, and 85 for the Classroom-Only group. The ANCOVA p-value was 0.45, $F(2, 101) = .57$, showing that the two groups' posttest final oral interview verb scores did not differ significantly in statistical terms. Results indicate that the Computer-Assisted group and the Classroom-Only group performed equally well in the accurate oral production of verb forms, after adjusting for individual differences in the pretest scores.

Discrete-Item Verb Test

Research question 2 also addressed whether participation in computer-assisted verb exercises has any effect on learners' ability to notice and focus attention on Spanish verb forms, thereby presumably learning the forms as shown by accurate written verb production. The posttest mean score for the discrete-item verb test was 82 for the Computer-Assisted group, and 73 for the Classroom-Only group. ANCOVA was run on the posttest data from the discrete-item verb test,

resulting in a p-value of 0.01, F(2, 101) = 6.94, showing that the groups' posttest discrete-item verb test scores differed significantly. These results indicate that their verb production performance on this measure was different at the end of the semester, whereas it was not at the beginning of the study.

Final Written Composition

ANCOVA was run on the posttest data from the final written composition. The posttest mean score was 86 for the Computer-Assisted group, and 87 for the Classroom-Only group. The p-value for this ANCOVA was 0.61, F(2, 101) = .27, showing that the groups' final written composition posttest verb scores did not differ significantly. These results indicate that the two groups performed equally well as far as the accurate written production of verb forms in a written composition. The posttest results are summarized in Table 4.2.

Table 4.2: Summary of posttest results

Posttest	**Computer-Assisted Group (N=50)**	**Classroom-Only Group (N=54)**	**p-value (p < .01)**
Final Oral Interview	86	85	0.45
Discrete-item verb exercise	82	73	0.01*
Written Composition	86	87	0.61

*significant

QUANTITATIVE ANALYSIS OF THE DATA

Self-Initiated Grammatical Corrections

In order to answer research question 3 regarding what effect, if any, participation in computer-assisted verb exercises has on learners' ability to use

verb structures in oral production in terms of more self-initiated grammatical corrections, frequencies of self-correction were counted in both the pretest and the posttest as described and exemplified in Chapter Three. The results from the oral pretest are represented in Table 4.3, showing that the two groups differed very little in the frequency of self-initiated corrections at the time of the oral pretest. The results from the oral posttest, however, showed that the Computer-Assisted learners displayed a greater frequency of self-initiated corrections than the Classroom-Only group, as seen in Table 4.3. Computer-Assisted learners corrected approximately three times more often than the Classroom-Only learners when they produced an incorrect verb form and then the correct verb form. Computer-Assisted learners corrected approximately four times more often than the Classroom-Only learners when they produced an incorrect verb form and then corrected to another incorrect verb form. Both groups had very few self-initiated corrections of a correct verb form to an incorrect verb form.

Table 4.3: Frequencies of oral pretest self-initiated corrections

Type of Correction	**Computer-Assisted Group (N = 50)**	**Classroom-Only Group (N = 54)**
Incorrect to Correct	3	4
Incorrect to Incorrect	0	0
Correct to Incorrect	1	1

Table 4.4: Frequencies of oral posttest self-initiated corrections

Type of Correction	**Computer-Assisted Group (N = 50)**	**Classroom-Only Group (N = 54)**
Incorrect to Correct	44	14
Incorrect to Incorrect	12	3
Correct to Incorrect	1	2

The Computer-Assisted learners increased the number of self-initiated corrections they produced from the time of the pretest to the posttest time. Posttest results show that they corrected themselves approximately fifteen times more often to change an incorrect verb form to the correct verb form than they did at the time of the pretest, twelve times as often for an incorrect verb form to another incorrect form, and about the same for the correct verb form to an incorrect form, illustrated in Table 4.5.

Table 4.5: Frequencies of oral self-initiated corrections by the Computer-Assisted learners

Type of Correction	**Pretest**	**Posttest**
Incorrect to Correct	3	44
Incorrect to Incorrect	0	12
Correct to Incorrect	1	1

The Classroom-Only learners had a much smaller increase in self-initiated corrections from the time of the pretest to the posttest. Posttest results show that they corrected themselves approximately three times more often for an incorrect verb form to the correct verb form than they did at the time of the pretest, three

times as often for an incorrect form to another incorrect form, and about the same for the correct verb form to an incorrect form, as shown in Table 4.6.

Table 4.6: Frequencies of oral self-initiated corrections by the Classroom-Only learners

Type of Correction	**Pretest**	**Posttest**
Incorrect to Correct	4	14
Incorrect to Incorrect	0	3
Correct to Incorrect	1	2

Transcription Analysis

In further regard to research question 3, there were observable qualitative between-group differences in oral production in terms of overall fluency with respect to conversational flow, which were noticeable to the researcher when she listened to the taped final oral interviews. The Computer-Assisted learners' speech seemed more hesitant with respect to conversational flow. In order to ascertain why their speech might be perceptibly different, further detailed data were gathered in the form of a transcription from the final oral interview. Analysis of all of the learners' oral production is beyond the scope of the present case study. For the sake of expediency, the interviews of just six of the learners were selected for transcription analysis. In order to have consistency between groups, and because it was thought that morphological ability or accuracy might be a factor in any perceived differences in learners' oral production, the participants whose speech would be transcribed were selected based on their score on the interview.[11]

[11]Refers to the final oral interview score obtained by the researcher according to the procedures for scoring the posttest data as described in Chapter 3.

Thus, the six participants were the Computer-Assisted learner and the Classroom-Only learner with the highest score on the interview, the Computer-Assisted learner and the Classroom-Only learner with the mean score on the interview, and the Computer-Assisted learner and the Classroom-Only learner with the lowest score on the interview. The learners' scores are summarized in Table 4.7. For the purposes of the present study, fluency was defined in terms of conversational flow—the use of pauses and conversational fillers—and not in terms of proficiency or the ability to speak like a native speaker.

Table 4.7: Final Oral Interview scores

Learner's Score	**Computer-Assisted Group (N = 3)**	**Classroom-Only Group (N = 3)**
Lowest	53	50
Mean	85	85
Highest	100	100

The researcher transcribed the majority of the final interview, which reflected mostly present tense production. The researcher also counted the total number of utterances, Spanish words, pauses, etc., and calculated the mean number of utterances, Spanish words, pauses, etc., produced by each of the six learners and by each of the two groups. Learner speech was not edited in any way, all pauses, interruptions, and student errors were transcribed as they appeared on the tapes. Only data produced by the learner were analyzed, and not the data produced by the instructor or the learner's partner in the case of the Computer-Assisted group. The transcriptions were analyzed for a number of factors:

(1) the total and mean number of utterances produced (e.g., total of 90 utterances/total of 3 learners = a mean of 30 utterances produced);

(2) the total and mean number of Spanish words produced per utterance (e.g., total of 171 Spanish words/total of 32 utterances = a mean of 5.34 Spanish words per utterance);

(3) the total and mean number of English words produced per utterance (e.g., total of 21 English words/total of 23 utterances = a mean of 0.91 English words per utterance);

(4) the total and mean number of conversational fillers produced per utterance (e.g., total of 11 conversational fillers/total of 23 utterances = a mean of 0.48 conversational fillers per utterance);

(5) the total and mean number of pauses produced per utterance (e.g., total of 37 pauses/total of 33 utterances = a mean of 1.12 pauses per utterance);

(6) the total pause time and mean pause length, in seconds, of each pause (e.g., total pause time of 141 seconds/total of 55 pauses = a mean pause length of 2.56 seconds per pause);

(7) the type of pause produced;

(8) the location of the pause.

These results are discussed and exemplified in the following sections.

Total Number and Mean Number of Utterances Produced

For the purposes of the present study, an *utterance* was considered to be a complete thought, and not necessarily the learner's complete response to a question or interview task. A complete response could be made up of one or more

utterances, and any one utterance could include one or more pauses and conversational fillers. Example (4.1) illustrates a learner's response that was comprised of two utterances; the first utterance contains three pauses and four conversational fillers while the second utterance has two pauses and four fillers:

(4.1) Ok ahm (2.0) durante ah el invierno ahm voy a (2.0) visitar mis padres en Baytown Tejas ahm (3.0). Voy a (2.0) visitar mis amigos ahm (3.0) y ah mi ah otra ah familia.

'Ok ahm (2.0) during ah the winter ahm I'm going to (2.0) visit my parents in Baytown Texas ahm (3.0). I'm going to (2.0) visit my friends ahm (3.0) and ah my ah other ah family.'

There were individual differences in the total number of utterances produced by each of the six learners, as illustrated in Tables 4.8 and 4.9. The Computer-Assisted learner with the lowest score, for example, produced 12 more utterances than the Classroom-Only learner with the lowest score. There was no way to control for such individual differences because the six learners were chosen for the transcription analyses based on their final oral interview score, and not on the number of utterances that they produced in the interview. Despite individual differences, these two groups of three learners are similar with respect to the total and mean number of utterances produced, as shown in Table 4.10.

Table 4.8: Total number of utterances produced by Computer-Assisted learners

Learner's score	**Total utterances**
Lowest (53)	35
Mean (85)	23
Highest (100)	32

Table 4.9: Total number of utterances produced by Classroom-Only learners

Learner's score	Total utterances
Lowest (50)	23
Mean (85)	33
Highest (100)	37

Table 4.10: Total and mean number of utterances produced

Group	Total utterances	Mean utterances
Computer-Assisted (N = 3)	90	30
Classroom-Only (N = 3)	93	31

Total Number of Spanish Words and Mean Number of Spanish Words per Utterance

The total number of Spanish words and the mean number of Spanish words produced per utterance for the Computer-Assisted and Classroom-Only learners are shown in Tables 4.11 and 4.12. Although the two groups produced about the same mean number of utterances, the Computer-Assisted learners' utterances were somewhat longer with more Spanish words per utterance (Table 4.13).

Table 4.11: Total and mean number of Spanish words produced by Computer-Assisted learners

Learner's Score	Total Spanish words	Mean Spanish words / utterance
Lowest (53)	252	7.20
Mean (85)	150	6.52
Highest (100)	171	5.34

Table 4.12: Total and mean number of Spanish words produced by Classroom-Only learners

Learner's Score	Total Spanish words	Mean Spanish words / utterance
Lowest (50)	117	5.09
Mean (85)	190	5.76
Highest (100)	196	5.30

Table 4.13: Total and mean number of Spanish words produced

Group	Total Spanish words	Mean Spanish words / utterance
Computer-Assisted (N = 3)	573	6.37
Classroom-Only (N = 3)	503	5.41

Total Number of English Words and Mean Number of English Words per Utterance

The use of English in the final oral interview was not common for either these six learners nor for the whole data population (N = 104). The learner with the lowest final oral interview score in both the Computer-Assisted and the Classroom-Only groups produced the most English words, while the other learners hardly reverted to English at all, as seen in Tables 4.14 and 4.15. These two learners do not represent group trends for the six transcription participants (Table 4.16), nor for the entire data sample population (N = 104). It is not surprising that learners with a low score have difficulty producing Spanish and therefore use more English.

Table 4.14: Total and mean number of English words produced by Computer-Assisted learners

Learner's Score	Total English words	Mean English words / utterance
Lowest (53)	25	0.71
Mean (85)	0	0.00
Highest (100)	1	0.03

Table 4.15: Total and mean number of English words produced by Classroom-Only learners

Learner's Score	Total English words	Mean English words / utterance
Lowest (50)	21	0.91
Mean (85)	1	0.03
Highest (100)	1	0.03

Table 4.16: Total and mean number of English words produced

Group	Total English words	Mean English words / utterance
Computer-Assisted (N = 3)	26	0.29
Classroom-Only (N = 3)	23	0.25

Both learners with the lowest scores used English when they experienced difficulty producing a response. Example (4.2) illustrates the use of English by the Computer-Assisted learner (L) who had difficulty responding to his instructor's (I) question, although he appeared to understand the question.

(4.2) Computer-Assisted learner with the lowest score

I: ¿Qué vas a hacer para Thanksgiving?

L: Ahm (2.0) ah yo (4.0) uhm (4.0) gosh (3.0). Mi familia (3.0) uh comes uh (3.0) voy a Austin y (2.0) comida pero yo trabajar hasta (2.0) el día (2.0) uhm (10.0). Let's see I just froze up.

I: *'What are you going to do for Thanksgiving?*

L: *Ahm (2.0) ah I (4.0) uhm (4.0) gosh (3.0). My family (3.0) uh comes uh (3.0) I go to Austin and (2.0) meal but I to work until(2.0) the day (2.0) uhm (10.0).* Let's see I just froze up.*'*

The Classroom-Only learner (L) had difficulty producing a response to her instructor's (I) question due to a lack of comprehension. She then reverted to English as shown in example (4.3).

(4.3) Classroom-Only learner with the lowest score

I: Ok, bien. Situaciones. Quieres estudiar en Colombia. Ok. Buenas tardes. Entiendo que usted es de Texas.

L: I don't understand. Is it saying what do I know about Texas?

I: *'Ok, good. Situations. You want to study in Colombia. Ok. Good afternoon. I understand you are from Texas.*

L: I don't understand. Is it saying what do I know about Texas?*'*

These same two learners also used English when they could not produce a Spanish vocabulary item. The Computer-Assisted learner reverted completely to using English when asking how to say the Spanish word he did not know, as shown by the following example.

(4.4) Computer-Assisted learner with the lowest score

I: Descríbeme tu rutina diaria los sábados.

L: Ah sábados yo trabajar (2.0) ahm (2.0) ah (2.0) nuevo (3.0) toward ah (2.0) 'til how do you say 'til?

I: *'Describe for me your daily routine on Saturdays.*

L: *Ah Saturdays I to work (2.0) ahm (2.0) ah (2.0) new (3.0)* toward ah *(2.0)* 'til how do you say 'til?*'*

In contrast, the Classroom-Only learner used English only to refer to the actual word she did not know how to say in Spanish.

(4.5) Classroom-Only learner with the lowest score

I: Y ¿qué quieres aprender de Colombia? ¿Por qué Colombia?

L: Ahm Colombia es muy bonita uhm y muy uh cultura es uhm (3.0) ¿cómo se dice *rich*?

I: *'And what do you want to learn from Colombia? Why Colombia?*

L: *Ahm Colombia is very pretty uhm and very uh culture is uhm (3.0) how do you say* rich*?'*

Total Number of Conversational Fillers and Mean Number of Conversational Fillers per Utterance

Learners used the following conversational fillers (non-lexical items)[12] in their final oral interview production: *uh*, *uhm*, *mm*, *ah*, *ahm*, which were counted for each learner. The total number of conversational fillers and the mean number of fillers produced per utterance by the Computer-Assisted and the Classroom-Only learners are shown in Tables 4.17 and 4.18.

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[12]For the purposes of the present study, non-lexical items that are not silent pauses are referred to as "conversational fillers." Riggenbach (1991) defines conversational fillers in a similar manner as "filled pauses" or "...voiced 'fillers' which do not normally contribute additional lexical information (uh, uhm)..." (p. 426). Wiese (1984, p. 18), and Freed (1995, p. 130) also refer to conversational fillers as "filled pauses".

Table 4.17: Total and mean number of fillers produced by Computer-Assisted learners

Learner's Score	Total fillers	Mean fillers / utterance
Lowest (53)	49	1.40
Mean (85)	11	0.48
Highest (100)	17	0.53

Table 4.18: Total and mean number of fillers produced by Classroom-Only learners

Learner's Score	Total fillers	Mean fillers / utterance
Lowest (50)	24	1.04
Mean (85)	63	1.91
Highest (100)	73	1.97

As a group the three Classroom-Only learners produced more conversational fillers per utterance than the Computer-Assisted learners did (Table 4.19).

Table 4.19: Total and mean number of fillers produced

Group	Total fillers	Mean fillers / utterance
Computer-Assisted (N = 3)	77	0.86
Classroom-Only (N = 3)	160	1.72

Total Number of Pauses and Mean Number of Pauses per Utterance

A *pause,* for the purposes of the present study, was defined as a period of silence lasting for two seconds or longer. The researcher timed each individual pause (discussed in the following sections) and counted the total number of pauses produced by each of the six targeted learners. The total number of pauses

and the mean number of pauses produced per utterance by the Computer-Assisted and the Classroom-Only learners are shown in Tables 4.20 and 4.21.

Table 4.20: Total and mean number of pauses produced by Computer-Assisted learners

Learner's Score	**Total pauses**	**Mean pauses / utterance**
Lowest (53)	55	1.57
Mean (85)	29	1.26
Highest (100)	20	0.63

Table 4.21: Total and mean number of pauses produced by Classroom-Only learners

Learner's Score	**Total pauses**	**Mean pauses / utterance**
Lowest (50)	25	1.08
Mean (85)	37	1.12
Highest (100)	11	0.30

The three Computer-Assisted learners produced more pauses, and more pauses per utterance, than the Classroom-Only learners did, as illustrated in Table 4.22.

Table 4.22: Total and mean number of pauses produced

Group	**Total pauses**	**Mean pauses / utterance**
Computer-Assisted (N = 3)	104	1.16
Classroom-Only (N = 3)	73	0.78

Total Pause Time and Mean Pause Length

The researcher timed each pause (discussed in more detail in the next section), and summed the length of the individual pauses produced by each of the six learners in order to calculate the total amount of pause time in seconds. Total

pause time and mean pause length are shown in Tables 4.23 and 4.24. The total pause time and the mean length of each pause for both groups are summarized in Table 4.25. These results indicate that the pauses produced by these six learners lasted about the same amount of time. Although the Computer-Assisted learners paused more often, their pauses did not have a longer average duration than the Classroom-Only learners' pauses.

Table 4.23: Total pause time and mean pause length by Computer-Assisted learners

Learner's Score	**Total time (in seconds)**	**Mean length (in seconds)**
Lowest (53)	141	2.56
Mean (85)	74	2.55
Highest (100)	50	2.50

Table 4.24: Total pause time and mean pause length by Classroom-Only learners

Learner's Score	**Total time (in seconds)**	**Mean length (in seconds)**
Lowest (50)	73	2.92
Mean (85)	96	2.59
Highest (100)	26	2.36

Table 4.25: Total pause time and mean pause length

Group	**Total time (in seconds)**	**Mean length (in seconds)**
Computer-Assisted (N = 3)	265	2.55
Classroom-Only (N = 3)	195	2.67

Individual Pause Length

The researcher recorded the length, in second increments, of each individual pause that all of the six learners produced. The total number of two,

three, four, five, six, seven, ten, and eleven second pauses for the Computer-Assisted and the Classroom-Only learners is shown in Tables 4.26 and 4.27. The two groups are compared in Table 4.28.

Table 4.26: Total number of pauses as measured in second increments produced by Computer-Assisted learners

Learner's Score	**2.0**	**3.0**	**4.0**	**5.0**	**6.0**	**10.0**
Lowest (53)	38	11	4	0	1	1
Mean (85)	19	6	2	2	0	0
Highest (100)	12	6	2	0	0	0

Table 4.27: Total number of pauses as measured in second increments produced by Classroom-Only learners

Learner's Score	**2.0**	**3.0**	**4.0**	**5.0**	**7.0**	**11.0**
Lowest (50)	16	4	2	2	0	1
Mean (85)	23	10	2	1	1	0
Highest (100)	8	2	1	0	0	0

Table 4.28: Total number of pauses as measured in second increments

Group	**2.0**	**3.0**	**4.0**	**5.0**	**6.0**	**7.0**	**10.0**	**11.0**
Computer-Assisted (N = 3)	69	23	8	2	1	0	1	0
Classroom-Only (N = 3)	47	16	5	3	0	1	0	1

The purpose of this section was to give a breakdown of the individual length of each pause produced by the six learners in order to illustrate how they compare. Results show that the majority of pauses produced by both groups was short (2 and 3 seconds, some 4 seconds), but that the three Computer-Assisted

learners had a higher frequency of pauses. These results support the observation that the three Computer-Assisted learners paused more often, and thus had a higher frequency of pauses than the three Classroom-Only learners.

Pause Type

Each of the six learners' transcription was analyzed for the type of pause produced. Learners produced several types of pauses as illustrated in examples (4.6) to (4.10).

(4.6) Word Search (including vocabulary items, prepositions, conjugated verb forms, and infinitives)

Vocabulary Item

Uhm ella lleva un vestido (2.0) negro.

'Uhm she is wearing a (2.0) black dress.'

Preposition

Sí ah porque ah necesita ah el cuarto (2.0) para uh dormir.

'Yes ah because ah he needs ah the room (2.0) for uh sleeping.'

Conjugated Verb Form

¿Cuánto dinero (2.0) quieres gastar?

'How much money (2.0) do you want to spend?'

Infinitive

Me gusta ah (4.0) travel uhm (2.0) visitar otros países.

'I like ah (4.0) travel uhm (2.0) to visit other countries.'

(4.7) Conjugation Search[13]

Sí busc-- (2.0) buscamos a la comida.

'Yes look-- (2.0) we look for food.'

Mi (2.0) toc-- toco el piano y estudiar música (2.0).

'Me (2.0) pl-- I play the piano and to study music (2.0).'

(4.8) Information Search (learners (L) were composing their response to their instructor's (I) question, or were considering what else to add to their response)

I: ¿Qué vas a hacer durante el descanso del invierno?

L: Ahm ahm (2.0) en descansa ahm de invierno ahm voy a descansar (2.0). Uhm uh quiero uh dormir ah y (2.0). Y ahm trabajo en ah mi jardín.

I: *'What are you going to do during the winter break?*

L: *Ahm ahm (2.0) in the winter break ahm I'm going to rest (2.0). Uhm uh I want uh to sleep ah and (2.0). And ahm I'll work in ah my garden.'*

(4.9) Lack of Comprehension

I: ¿Qué vas a hacer durante el descanso del invierno?

L: Ah (7.0).

I: ¿Qué vas a hacer durante el descanso del invierno después de este semestre?

L: Ok ahm (2.0) durante ah el invierno ahm voy a...

I: *'What are you going to do during the winter break?*

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[13]For the purposes of the present study, pauses of this type were considered as conjugation searches rather than as the learners' doubt about using the correct lexical item.

L: *Ah (7.0).*

I: *What are you going to do during the winter break after this semester?*

L: *Ok ahm (2.0) during ah the winter ahm I'm going to...'*

(4.10) End of Response (learners (L) had completed the last utterance of their response and seemed to be waiting for their instructor (I), or their partner (P), to continue the conversation or elicit more information)

Computer-Assisted Learner waiting for Partner's response

L: ..los edificios son muy muy uh (2.0) bonito bonita uh (6.0).

P: Ahm (2.0) ahm (2.0) voy a...

L: *'..the buildings are very very uh (2.0) pretty (wrong form) pretty uh (6.0).*

P: *Ahm (2.0) ahm (2.0) I'm going to...'*

Classroom-Only Learner waiting for Instructor's response

L: Uhm (11.0) no fumar en el aeropuerto (5.0).

I: Ok, bien.

L: *'Uhm (11.0) no smoking in the airport (5.0).*

I: *Ok, good.'*

Each type of pause and the number of times that a pause of that type occurred for each learner are summarized in Tables 4.29 and 4.30. A comparison of the two groups is summarized in Table 4.31.

Table 4.29: Pause type produced by Computer-Assisted learners

Pause Type	**Lowest Score (53)**	**Mean Score (85)**	**Highest Score (100)**
Word search	25	8	4
Conjugation search	1	0	0
Information search	28	20	15
Lack of comprehension	0	0	1
End of thought	1	1	0

Table 4.30: Pause type produced by Classroom-Only learners

Pause Type	**Lowest Score (50)**	**Mean Score (85)**	**Highest Score (100)**
Word search	4	11	3
Conjugation search	1	0	1
Information search	17	24	7
Lack of comprehension	0	1	0
End of thought	3	1	0

Table 4.31: Pause type produced

Pause Type	**Computer-Assisted Group (N = 3)**	**Classroom-Only Group (N = 3)**
Word search	37	18
Conjugation search	1	2
Information search	63	48
Lack of comprehension	1	1
End of thought	2	4

The majority of pauses produced by each group of three learners comprised either word searches or information searches. The Computer-Assisted learners produced a total of 104 pauses, of which 36% (37/104) were word searches and 61% (63/104) were information searches. The Classroom-Only learners produced a total of 73 pauses, of which 25% (18/73) were word searches and 66% (48/73) were information searches. Findings indicate that these six learners did not differ much in the type of pauses that they produced. Rather, they differed in the quantity of pauses produced, with the Computer-Assisted learners pausing more often regardless of the type.

Pause Location

The transcription of each of the six learners was analyzed for the location of every pause. Pauses were found in several locations as shown in examples (4.11) to (4.19).[14]

[14]For the sake of consistency, the majority of the pauses were considered as located before a word, rather than after, except where noted in examples (4.17) to (4.19).

(4.11) Pre-lexical (before a lexical item)

Tengo (2.0) diecinueve años.

'I'm (2.0) nineteen years old.'

(4.12) Pre-filler (before a conversational filler)

Uh mi madre (2.0) uh vive en Corpus Christi.

'Uh my mother (2.0) uh lives in Corpus Christi.'

(4.13) Pre-verb (before a verb form, conjugated or infinitive)

¿Cuánto dinero (2.0) quieres gastar?

'How much money (2.0) do you want to spend?'

Voy a (2.0) visitar mis amigos.

'I'm going to (2.0) visit my friends.'

(4.14) Pre-English (before an English word or phrase)

Ah mi mamá (2.0) if my mom's in town.

'Ah my mom (2.0) if my mom's in town.'

(4.15) Pre-preposition (before a preposition)

Vivo (2.0) en la casa con mis amigos.

'I live (2.0) in the house with my friends.'

(4.16) Pre-utterance (at the beginning of an utterance)[15]

(3.0) Ah (2.0) gusta ahm (3.0) mirar bandas...

(3.0) Ah (2.0) I like ahm (3.0) to watch bands...'

[15]Pauses that occurred at the beginning of an utterance were considered Pre-utterance rather than as Pre-lexical or Pre-filler, located before the following word.

(4.17) Post-filler / Pre-utterance (after a conversational filler at the beginning of an utterance)[16]

Uhm (2.0) Señor Gómez es muy tarde para su vuelo ahm a México.

'Uhm (2.0) Mr. Gómez is very late for his flight ahm to Mexico.'

(4.18) Post-filler / Post-utterance (after a conversational filler at the end of an utterance)

Sí ah tengo dos padres y dos hermanas y hermanos ahm (2.0).

'Yes ah I have two parents and two sisters and brothers ahm (2.0).'

(4.19) Post-utterance (at the end of an utterance)

En el aeropuerto hombre comprar compro boleto de ida y de vuelta (3.0).

'In the airport man to buy I buy a roundtrip ticket (3.0).'

Pause location and the number of times that a pause occurred in that location for each learner are summarized in Tables 4.32 and 4.33. A comparison of the two groups is summarized in Table 4.34.

[16]Pauses located after a filler at the beginning of an utterance were considered Post-filler / Pre-utterance, rather than as located Pre-lexical, before the following word.

Table 4.32: Pause location by Computer-Assisted learners

Pause Location	Lowest Score (53)	Mean Score (85)	Highest Score (100)
Pre-lexical	19	7	3
Pre-filler	8	7	4
Pre-verb	9	4	4
Pre-English	7	0	0
Pre-preposition	2	3	0
Pre-utterance	3	1	0
Post-filler / Pre-utterance	1	3	5
Post-filler / Post-utterance	2	0	0
Post-utterance	4	4	4

Table 4.33: Pause location by Classroom-Only learners

Pause Location	Lowest Score (50)	Mean Score (85)	Highest Score (100)
Pre-lexical	6	13	0
Pre-filler	2	1	3
Pre-verb	1	4	2
Pre-English	0	0	0
Pre-preposition	0	2	0
Pre-utterance	0	1	0
Post-filler / Pre-utterance	4	10	3
Post-filler / Post-utterance	6	5	1
Post-utterance	6	1	2

Table 4.34: Pause location

Pause Location	**Computer-Assisted Group (N = 3)**	**Classroom-Only Group (N = 3)**
Pre-lexical	29	19
Pre-filler	19	6
Pre-verb	17	7
Pre-English	7	0
Pre-preposition	5	2
Pre-utterance	4	1
Post-filler / Pre-utterance	9	17
Post-filler / Post-utterance	2	12
Post-utterance	12	9

The majority of pauses produced by the three Computer-Assisted learners occurred within an utterance, whereas the majority of pauses produced by the three Classroom-Only learners occurred at the beginning or the end of an utterance. The Computer-Assisted learners produced a total of 104 pauses, 74% (77/104) occurred within an utterance (Pre-lexical, Pre-filler, Pre-verb, Pre-English, or Pre-preposition), and 26% (27/104) were pre- or post-utterance type pauses (Pre-utterance, Post-filler / Pre-utterance, Post-filler / Post-utterance, or Post-utterance). The Classroom-Only learners produced a total of 73 pauses, 47% (34/73) were within-utterance type pauses, and 53% (39/73) were pre- or post-utterance type. The three Classroom-Only learners' speech shows a more balanced distribution of pause location, although more of their pauses did occur before or after an utterance, whereas the three Computer-Assisted learners' speech reflects a

noticeable majority of pauses that occur within an utterance, which disrupts the flow of conversation.

The results from the transcription analysis are limited to the six learners whose speech was transcribed, and are thus tentative and exploratory. Findings indicate that the three Computer-Assisted learners demonstrated less overall fluency in their oral production in terms of conversational flow. Possible explanations for the findings from the statistical and quantitative analyses of the data are discussed in the next chapter.

CHAPTER FIVE

Conclusions

The present chapter summarizes and discusses the quantitative and qualitative findings and observations of this case study. The chapter also describes how the computer-enhanced first-semester Spanish course at the University of Texas at Austin evolved from the first phase of implementation, during which the present case study was conducted, to the subsequent utilization of computers in the first-semester Spanish course. Research conclusions related to the case study are presented, along with any findings that correspond with what the Spanish department learned and the decisions it made to further the development of the technology-enhanced first-semester course. The chapter concludes with a recognition of study limitations and proposes directions for future research.

CASE STUDY FINDINGS

Quantitative Results and Observations

This section summarizes and discusses the quantitative results and observations of the study, specifically the statistical and quantitative analysis of the pretest and posttest data and the quantitative analysis of the six sample transcriptions. Any interpretation of the statistical results must be tempered by the acknowledgement that we know the two groups of learners are different, although we equalized them statistically in order to compare their verb production performance again at the end of the semester. Furthermore, interpretation of the

quantitative results from the transcriptions must also be tempered by the fact that generalizations cannot be made based on analysis of the speech of only six learners. Findings are thus exploratory and limited to this case study.

Statistical analysis of the oral pretest data showed that the Computer-Assisted and Classroom-Only learners' oral verb production performance was different at the beginning of the semester with regard to the accurate production of Spanish verb forms. The Computer-Assisted learners' oral verb production was statistically more accurate than that of the Classroom-Only learners. A possible explanation for the difference in performance is that the pretest recording of the picture description was part of the syllabus for the Computer-Assisted learners who knew that they would receive a grade for the exercise. The Classroom-Only learners, however, knew that the recording would be used for the sole purposes of the present study and that they would not receive a grade on the exercise, because their participation was strictly voluntary. It is probable that the Computer-Assisted learners prepared in advance of the activity by studying the grammar and vocabulary they were learning at that point in the semester since they knew their performance on the recording was factored into their semester grade. The Classroom-Only learners also participated in activities in which they described a variety of pictures in order to practice grammar and vocabulary at a particular point in the semester. They probably did not, however, study specifically for the pretest activity prior to it since they did not expect to come to class and be graded on the exercise.

The oral posttest, the final oral interview, was a graded activity for both groups. It is thus very likely that the majority of the learners, if not all, prepared in

advance, because the interview was part of their final exam grade. Results from the statistical analysis of the oral posttest data showed that the Computer-Assisted and Classroom-Only learners' oral verb production performance was not statistically different at the end of the semester with regard to the accurate production of Spanish verb forms on the final oral interview. Lack of statistical differences does not necessarily indicate no effect, but rather, no statistically significant effect. Therefore, we suggest participation in the computer-assisted verb exercises had a positive effect on the Computer-Assisted learners' ability to notice and focus attention on Spanish verb structures, because they answered oral interview questions as appropriately and accurately as the Classroom-Only group.

Statistical analysis of the pretest discrete-item verb test indicated that there were no between-group differences for the learners' written verb production performance on this activity at the beginning of the study. At the end of the study, however, the two groups' posttest scores yielded significant statistical differences. Specifically, the Computer-Assisted learners produced a greater number of accurate verb forms than the Classroom-Only learners on this particular exercise. These findings are not necessarily surprising, because the discrete-item verb test was similar to many of the computer-based grammar activities completed during the semester that involved filling in blanks with correct grammatical structures. Results suggest participation in the computer-assisted verb exercises had a positive effect on the learners' noticing of and attention to Spanish verb structures, demonstrated as greater accuracy in written verb production on the discrete-item verb test than that of the Classroom-Only learners. Greater accuracy on this type of activity may be somewhat superficial, since language production is more

creative than just filling in blanks with correctly conjugated verbs (i.e., speech, a written paragraph, or a composition).

The written verb production performance of both the Computer-Assisted and the Classroom-Only learners was not statistically different with regard to accuracy on the pretest written composition nor on the posttest final written composition. As suggested with respect to the oral posttest results, a lack of significant statistical differences indicates there is no statistically significant effect, but does not necessarily imply no effect at all. The Computer-Assisted learners demonstrated the ability to produce accurate verb forms on an exercise that was a more creative use of the target language—at least in comparison to the fill-in-the-blank discrete-item verb test. It is therefore possible that participation in the computer-assisted verb exercises had a positive effect on the accuracy of the learners' written Spanish verb form production, and that the exercises helped the learners to notice, focus attention on, and learn the verb structures.

Quantitative analysis of the oral pretest frequencies of self-initiated corrections indicated that the Computer-Assisted and Classroom-Only learners' behavior was virtually the same as far as the quantity of self-corrections produced. Neither group seemed more or less aware of errors in their speech they perceived should be corrected. The oral posttest yielded a greater frequency of self-initiated corrections by the Computer-Assisted group, which could indicate they noticed and were more aware of making errors in their speech than the Classroom-Only learners. Participation in the computer-assisted verb exercises may have helped the Computer-Assisted learners to focus attention on verb structures and to monitor their oral production for errors that they then corrected.

Kormos (1999) and Green and Hecht (1993) suggest self-corrections are overt manifestations of monitoring, and that self-corrections may lead to improvement or to further error (Green & Hecht, 1993). The majority of self-corrections in the present study did lead to correct forms and a small number of self-corrections yielded further error. One could also suggest that rather than monitoring their speech and being more aware of errors that needed correction, the Computer-Assisted learners simply made more mistakes than the Classroom-Only learners did. The Computer-Assisted group corrected themselves a total of 57 times, and when this number is considered with respect to the total number of verb forms that the group produced (989), then 57 self-corrections do not seem to indicate a greater frequency of errors.

Quantitative analysis of the six sample transcriptions showed similarities and differences between the three Computer-Assisted learners and the three Classroom-Only learners. All six of the learners produced approximately the same total and mean number of utterances, and produced pauses of about the same time duration, the majority of which were of the same type (word searches and information searches). Learners differed in the total number of Spanish words, pauses, and fillers produced per utterance, as well as in the location or distribution of the pauses.

The three Computer-Assisted learners produced more Spanish words per utterance, which could be due to the format of their final oral interview (Appendix E). The final oral interview for the computer-assisted sections was structured in a manner that could elicit more oral production from the learners, because they did at least half of their interview with a partner from class. Conversely, the final oral

interview format (Appendix F) for the classroom-only sections allowed for the possibility that the instructor might speak almost as much as the learners, because the Classroom-Only learners did their entire interview with their instructor. It is also possible that the three Computer-Assisted learners benefited from participation in the various computer-based activities such that their knowledge base of Spanish grammar and vocabulary was not lacking. Perhaps the computer-assisted exercises helped to draw their attention to Spanish vocabulary and grammatical structures that they then used appropriately in their oral production on the final interview.

Although the three Computer-Assisted learners produced more Spanish words per utterance, they also exhibited a higher frequency of silent pauses, which seemed to contribute to the perception of their speech as hesitant in comparison to that of the three Classroom-Only learners. It is likely that the Computer-Assisted learners produced more pauses because, having focused on grammatical forms in many of the computer-facilitated activities in which they participated, they may have been constantly searching for the correct form that they wanted to use. A higher frequency of pauses does not necessarily indicate a lack of knowledge or understanding, but rather the possibility of concurrent processing of both form and meaning as they were creating the message. The three Computer-Assisted learners were able to produce responses that were as accurate and content-appropriate as those of the three Classroom-Only learners. Another possibility for the use of more pauses by these Computer-Assisted learners could be due to fewer opportunities for oral production practice than the Classroom-Only learners who were in class with their instructor and classmates

five days a week. While the Computer-Assisted learners may have been with their classmates five days a week, the two days of computer lab time were not structured to allow oral interaction with other classmates.

The three Classroom-Only learners, in contrast, produced more conversational fillers and fewer silent pauses. Their use of conversational fillers seemed to keep their speech flowing, especially in comparison to the Computer-Assisted learners whose pauses seemed to break up the flow of their speech with several periods of silence in the form of these pauses. The use of more conversational fillers may have contributed to the perceived differences in the learners' speech, whereby the three Classroom-Only learners sounded more fluent compared to the three Computer-Assisted learners with respect to conversational flow. Conversational fillers seem to aid the flow of oral production, and are found in native speaker speech (Guillot, 1999; Lennon, 1990).

The location of the pauses also differentiated the oral production of these six sample participants. The Classroom-Only learners produced more pauses that occurred before or after an utterance while they seemed to be searching for the next piece of information that they wanted to convey. The location of the three Classroom-Only learners' pauses, combined with their use of conversational fillers to aid in the flow of conversation, made their speech appear to be less choppy and more fluent. Conversely, the three Computer-Assisted learners produced more pauses that occurred within an utterance which, combined with their higher frequency of pauses, seemed to impede the flow of their speech. Pauses that occur at the beginning or end of an utterance do not disrupt the flow of speech the way pauses that occur within an utterance do, especially if there are

several of them within a single utterance. Pause distribution may have played a role in the perceived differences in the learners' speech so that the Computer-Assisted learners' oral production was perceived as less fluent than that of the Classroom-Only learners with respect to conversational flow. Perhaps the Computer-Assisted learners were more aware of their production of correct forms since they had been focused on grammatical structures during the semester via many of the computer lab activities.

Qualitative Results and Observations

This section discusses and exemplifies the qualitative results and observations from the analysis of the six sample transcriptions, specifically learner pause behavior. As was the case with the quantitative results and observations, any interpretation of the findings must be tempered by the fact that they are confined to these six sample participants, because generalizations cannot be made based upon the pause behavior of just six learners. Results are exploratory and limited to the present study.

The majority of pauses produced by the six learners were either word searches or information searches, and were of almost the same average duration. Most of the pauses produced were short—two, three, and some four seconds in length. Thus, the six learners did not differ in type of pause or pause duration, but rather in the quantity of pauses they produced, as illustrated in the following examples. The bolded numbers in parentheses in examples (5.1) to (5.7) represent pause location and the duration of each pause in seconds. In example (5.1), the Computer-Assisted learner's utterance contains 12 words and 4 pauses; the

Classroom-Only learner's utterance in example (5.2) contains 13 words and 2 pauses.

(5.1) Computer-Assisted Learner

Y **(2.0)** ah **(2.0)** everyone else uh **(2.0)** *todos **(3.0)** *los *otros personas *vive en Austin.

'And (2.0) ah (2.0) everyone else uh (2.0) all (agreement error) (3.0) the other people (agreement error) lives (3rd person singular) in Austin.'

(5.2) Classroom-Only Learner

Voy a **(2.0)** visitar mis amigos ahm **(3.0)** y ah mi ah otra ah familia.

'I'm going to (2.0) visit my friends ahm (3.0) and ah my ah other family.'

A higher frequency of pauses could give the impression of longer periods of silence in the overall perception of the three Computer-Assisted learners' oral production, even though their pauses were not longer than those of the three Classroom-Only learners. Non-native speakers do not actually produce pauses of longer duration than native speakers, but may appear to do so because non-native speakers often produce a greater number of short pauses (Chambers, 1997).

The three Computer-Assisted learners may have been more focused on forms or more aware of monitoring their language processing, which is not necessarily negative. What seems problematic, however, is that the higher frequency of pauses could be a factor in the overall quality of their speech whereby the investigator, and perhaps other listeners, perceived it as choppy and not fluent. Riggenbach's (1991) findings indicated that unfilled pauses contributed to judgments of fluency and nonfluency. Riggenbach suggested listeners associate more hesitations with lower fluency, and fewer hesitations with higher fluency.

Although pauses are a normal feature of conversational interaction, silence is often viewed as a sign of dysfluency, especially in foreign language speech where it may be perceived as the poor functioning of mental processing rather than as a normal feature of speech processing (Chambers, 1997). One might erroneously conclude that these learners' language production is not very accurate as a result of the higher frequency of hesitation phenomena in their speech.

The higher number of pauses on the part of the three Computer-Assisted learners does not indicate lack of ability to produce accurate language. The Computer-Assisted learners seemed to give concurrent attention to form and meaning as they were processing and preparing their responses. All three of the Computer-Assisted learners were able to answer appropriately regardless of final interview score, illustrated in examples (5.3) to (5.5). Each Computer-Assisted learner (L) responded correctly to the Instructor's (I) question with respect to content, despite the presence of pauses or grammatical errors.

(5.3) Computer-Assisted Learner with the lowest score

I: ¿Qué te gusta hacer en Austin?

L: Ah **(2.0)** *gusto ahm **(3.0)** mirar ahm las bandas y uh **(2.0)** visitar el parque y uh leer uh **(2.0)**…

I: *'What do you like to do in Austin?*

L: *Ah (2.0) I like ahm (3.0) to see ahm bands and uh (2.0) visit the park and uh read uh (2.0)…'*

(5.4) Computer-Assisted Learner with the mean score

I: ¿Cómo estás?

L: Ahm estoy muy bien pero **(2.0)** uh **(2.0)** pero **(2.0)** estoy nervioso.

I: *'How are you?*

L: *Ahm I'm very well but (2.0) uh (2.0) but (2.0) I'm nervous.'*

(5.5) Computer-Assisted Learner with the highest score

I: ¿Cuál es tu rutina normal todos los días?

L: Ahm (3.0) me *despierte —> despierto a las siete de la mañana.

I: *'What is your normal routine every day?*

L: *Ahm (3.0) I gets up (3rd person singular —> I get up at seven in the morning.'*

The three Computer-Assisted learners used fewer conversational fillers (filled pauses) per utterance than the three Classroom-Only learners, which also may have contributed to the perception of their oral production as choppy. Native speakers use fillers to aid the flow of speech, with most occurring at major planning points where task stress is greatest (Guillot, 1999; Lennon, 1990). Filled pauses provide thinking-space as the speaker proceeds with message construction (Guillot, 1999). The three Classroom-Only learners seemed to use fillers in this manner, which may have contributed to why their speech, in general, was perceived as more fluent than that of the Computer-Assisted learners. Because these Classroom-Only learners used more fillers and fewer pauses, their speech contained fewer periods of silence that often impede conversational flow. The three Classroom-Only learners tended to use conversational fillers in order to keep conversation flowing in much the same way as native speakers do (cf. Guillot, 1999; Chambers, 1997). The three Computer-Assisted learners also used fillers, but they were often accompanied by silent pauses, which, together, contributed to the choppy quality of their speech. Specifically, these Computer-

Assisted responses tended to have fillers *and* pauses, whereas the three Classroom-Only responses tended to have fillers *rather than* pauses. Therefore, silent pauses combined with conversational fillers made the three Computer-Assisted learners′ speech seem dysfluent in comparison to speech that contained more fillers than pauses, as illustrated by the following examples. In example (5.6), the Computer-Assisted learner′s response contains 10 pauses and 6 fillers (in bold), while the Classroom-Only learner′s response in example (5.7) contains 2 pauses and 8 fillers (in bold).

(5.6) Computer-Assisted Learner

Ahm (2.0) ah yo **(4.0) uhm (4.0)** gosh **(3.0)**. Mi familia **(3.0) uh** comes **uh (3.0)** *voy a Austin y **(2.0)** comida pero yo *trabajar hasta **(2.0)** el día **(2.0) uhm (10.0)**.

'Ahm (2.0) ah I (4.0) uhm (4.0) gosh (3.0). My family (3.0) uh comes uh (3.0) go (1st person singular) to Austin and (2.0) food but I to work until (2.0) the day (2.0) uhm (10.0).'

(5.7) Classroom-Only Learner

Ah (2.0) quiero **ah** viajar **uhm** a España y México **ahm** porque **ahm (2.0)** tengo **ahm** muchos dólares **ahm** de mi tía **ahm**.

Ah (2.0) I want ah to travel uhm to Spain and Mexico ahm because ahm (2.0) I have ahm a lot of money ahm from my aunt ahm.'

A particularly striking outcome from the transcription analysis of all six learners was the distribution of pauses. The majority of pauses the three Classroom-Only learners produced occurred at the beginning or end of an utterance, whereas, the majority of pauses the three Computer-Assisted learners

produced occurred within an utterance. According to Chambers (1997), Riggenbach (1991), and Lennon (1990), fluent-sounding short pauses occur at the predictable places of the beginning or end of an utterance (inter-clausal boundaries). Dysfluent-sounding short pauses occur at places other than inter-clausal boundaries (intra-clausal), making speech sound choppy rather than smooth.

Examples (5.8) to (5.13) show that the three Computer-Assisted learners, regardless of final oral interview score, paused more often within an utterance than the three Classroom-Only learners. For the sake of consistency, Computer-Assisted learner speech in the examples was excerpted from the description of daily routines in their final oral interview. Classroom-Only learner speech in the examples was excerpted from the picture description portion of their final oral interview. Both instructor (I) and learner (L) speech is included in all of the excerpts. In the following examples, bolded numbers in parentheses represent the duration of intra-utterance pauses, and unbolded numbers in parentheses represent the location and duration of all other pauses. Examples (5.8) and (5.9) are from the interviews of the learners with the lowest score. The Computer-Assisted learner's response contains 13 intra-utterance pauses, compared to the Classroom-Only learner's response that contains 1 intra-utterance pause.

(5.8) Computer-Assisted Learner with the lowest score

I: Descríbeme tu rutina diaria los sábados.

L: Ah sábados yo *trabajar **(2.0)** ahm **(2.0)** ah **(2.0)** nuevo **(3.0)** toward ah **(2.0)** 'til how do you say 'til?

I: Hasta.

L: Hasta ah **(2.0)** dos o tres en la tarde y **(2.0)** y (2.0). *Todos **(3.0)** la tarde yo duermo o *estudiar (3.0). En la noche yo **(4.0)** voy *al la fiesta o **(3.0)** dormir más **(2.0)** con mis amigos o solo. Pero **(2.0)** ah mi mamá **(2.0)** if my mom's in town uhm…

I: *'Describe for me your daily routine on Saturdays.*

L: *Ah Saturdays I to work (2.0) ahm (2.0) ah (2.0) new (3.0) toward ah (2.0) 'til how do you say 'til?*

I: *Hasta.*

L: *Until ah (2.0) two or three in the afternoon and (2.0) and (2.0). Every (agreement error) (3.0) afternoon I sleep or to study (3.0). At night I (4.0) go to the party or (3.0) to sleep more (2.0) with my friends or alone. But (2.0) ah my mom (2.0) if my mom's in town uhm…'*

(5.9) Classroom-Only Learner with the lowest score

I: Vamos a la descripción del dibujo.

L: En el aeropuerto hombre *comprar *compro boleto de ida y de vuelta (3.0). Uh (2.0) ella es muy desordenida.

I: Desorganizada. Muy bien.

L: Desorganizada uhm (2.0). Uh (3.0) no le gusta hacer maleta y uhm (2.0). *Los personas *facturar maletas (3.0). Y un hombre *leer **(2.0)** y eh no hace cola.

I: *'Let's go to the description of the picture.*

L: *In the airport man to buy buy (1st person singular) a roundtrip ticket (3.0). Uh (2.0) she is very disorganized (uses wrong word).*

I: *Disorganized. Very good.*

L: *Disorganized uhm (2.0). Uh (3.0) she doesn't like to pack her suitcase and uhm (2.0). The (agreement error) people to check luggage (3.0). And a man to read (2.0) and eh he doesn't wait in line.'*

Examples (5.10) and (5.11) are from the interviews of the learners with the mean score. The Computer-Assisted learner's response contains 7 intra-utterance pauses, while the Classroom-Only learner's response contains 2 intra-utterance pauses.

(5.10) Computer-Assisted Learner with the mean score

I: Describe tu rutina diaria durante la semana. ¿Qué haces en un día típico?

L: Me levanto a las nueve más o menos en la mañana. Ahm (2.0) y **(2.0)** y me **(5.0)** y me **(4.0)** afeito a las diez en la mañana (2.0). Uhm (2.0) próximo **(2.0)** uh yo como (4.0). Yo tengo *un clase a las *un **(2.0)** y…

I: (interrupts) ¿A la una?

L: A la una (3.0). Y (5.0) y yo tengo **(3.0)** *un una clase **(2.0)** a las cuatro.

I: *'Describe your daily routine during the week. What do you do in a typical day?*

L: *I get up at nine in the morning more or less. Ahm (2.0) and (2.0) and I (5.0) and I (4.0) shave at ten in the morning (2.0). Uhm (2.0) next (2.0) uh I eat (4.0). I have a (agreement error) class at one (agreement error) (2.0) and…*

I: (interrupts) *¿At one?*

L: *At one. (3.0) And (5.0) and I have (3.0) a (agreement error) a class (2.0) at four.'*

(5.11) Classroom-Only Learner with the mean score

I: ¿Puedes describir este dibujo por favor?

L: (4.0) En el aeropuerto uhm **(3.0)** de Houston uhm hay *muchos muchas personas en el aeropuerto. Uhm (2.0) Señor Gómez es muy tarde para su vuelo ahm a México. Ah (2.0) él es muy tarde porque su esposa es muy enferma at su casa ahm (5.0). También uhm **(2.0)** hay tres personas en la sala de *esperar. Ahm hay no fumar en la sala de *esperar. Uh (3.0) un hombre ahm *leyendo uhm un periódico.

I: *'Can you describe this picture please?*

L: *(4.0) In the airport uhm (3.0) in Houston uhm there are many (agreement error) many people at the airport. Uhm (2.0) Mr. Gómez is very late for his flight ahm to Mexico. Ah (2.0) he is very late because his wife is very sick at their house ahm (5.0). Also uhm (2.0) there are three people in the room to wait (wrong form for "waiting room"). Ahm there is no smoking in the room to wait. Uh (3.0) a man ahm reading uhm a newspaper.'*

Examples (5.12) and (5.13) were excerpted from the interviews of the learners with the highest score. The Computer-Assisted learner's response contains 4 intra-utterance pauses, compared to the Classroom-Only learner's response that contains 1 intra-utterance pause.

(5.12) Computer-Assisted Learner with the highest score

I: ¿Cuál es tu rutina normal todos los días?

L: Ahm (3.0) me *despierte despierto a las siete de la mañana ahm ahm. (3.0) Me ducho **(2.0)** a las siete y cinco de la mañana (2.0). Ahm (3.0) me **(2.0)** yo voy a la escuela a las ocho de la mañana.

I: ¿Cuántas clases tienes?

L: Ahm tengo económica, la administración de empresa, ahm español y **(2.0)** ¿cómo se dice marketing?

I: Mercadeo.

L: Ah huh.

I: ¿A qué hora vuelves a casa?

L: Ah vuelvo a la casa a las **(2.0)** ahm tres de la tarde.

I: *'What is your normal routine every day?*

L: *Ahm (3.0) I gets up (3rd person singular) get up at seven in the morning ahm ahm. (3.0) I shower (2.0) at five after seven in the morning (2.0). Ahm (3.0) I (2.0) I go to school at eight in the morning.*

I: *How many classes do you have?*

L: *Ahm I have economics, business administration, ahm Spanish and (2.0) how do you say marketing?*

I: Mercadeo.

L: *Ah huh.*

I: *What time do you return home?*

L: *Ah I return to the house at (2.0) ahm three in the afternoon.'*

(5.13) Classroom-Only Learner with the highest score

I: ¿Puedes describir este dibujo por favor?

L: Ahm ahm hay muchas personas en el aeropuerto. Ahm cuatro personas hacen cola ahm para facturar ah sus equipajes. Ahm hay no fumar en la sala de *esperar. Ah un hombre está leye— leyendo un periódico. Ahm un hombre está durmiendo. Ahm él ah la ella uh **(2.0)** hace maleta ah su maleta uhm porque ella es desorganizada ahm (2.0).

I: *'Can you describe this picture please?*

L: *Ahm ahm there are many people at the airport. Ahm four people are standing in line ahm to check ah their luggage. Ahm there is no smoking in the room to wait (wrong form for "waiting room"). Ah a man is read— reading a newspaper. Ahm a man is sleeping. Ahm he ah the she uh (2.0) is packing suitcase ah her suitcase because she is disorganized ahm (2.0).'*

The preceding sections presented the quantitative and qualitative results and observations from the present case study. In summary, findings tend to indicate that participation in computer-assisted verb exercises had a positive effect on learning Spanish verb structures with respect to accurate oral and written production for these participants during the first phase of the implementation of the computer lab. Additionally, the analysis of the six sample transcriptions showed between-group differences with respect to learner pause behavior whereby the three Computer-Assisted learners exhibited a higher frequency of silent pauses distributed within an utterance.

The following sections describe the evolution of the first-semester Spanish program from the first phase of the implementation of the computer lab to its current state, the challenges the Spanish department met, and how it responded to

meet and resolve those challenges. Research conclusions related to the present case study are presented, including reference to any study observations and findings that correspond with what the department learned and the decisions it made to further the growth and development of the program with the technology component.

COMPUTER TECHNOLOGY IN SECOND LANGUAGE ACQUISITION

The implementation of computers in language teaching has evolved over the last several years. Computers were used first outside of class as drill and test machines that helped learners master language forms, often as a means of replacing certain teacher functions. More recently, utilization of computer technology has proven to have more pedagogical value when its use is structured and guided by teachers in collaboration with classroom instruction (Kern, 1998). The introduction of a new technology, from a word processor to an Internet connection, will affect the range of learning opportunities available and the ways in which learning tasks are created and executed (Levy, 1997a). Levy further points out that the implementation of technology can alter course curriculum in manners that cannot be predicted. The Spanish department at the University of Texas at Austin experienced both anticipated and unanticipated changes after implementing technology in the first-semester Spanish curriculum. Most of the changes were beneficial; however, some presented challenges from which to learn that resulted in positive improvement for the program as it evolved from the beginning stage of computer technology implementation to its current state.

Evolution of Computer-Enhanced First-Semester Spanish at the University of Texas at Austin

The implementation of computer technology in the first-semester Spanish course at the University of Texas at Austin played an important role in confronting some of the challenges the Spanish department was facing: the strain on institutional resources the demand for classes was causing, and the heavy workload the graduate student instructors carried in addition to their academic responsibilities. The new program format for the first-semester Spanish course—three days with an instructor and two days in the computer lab—initially saved the department from paying for ten assistant instructor positions. There were, however, additional labor costs related to the new format, such as hiring teaching assistants (first-year graduate students) to monitor and run the lab. Actual savings for the department were probably closer to seven instructor positions (Sutherland-Meier, 1999). In the long run, savings with regard to the number of instructor positions meant that the department still hired the same number of instructors as before, but could distribute the workload more equitably (Sutherland-Meier, 1999). The department policy had been that graduate student instructors would teach one section of a five-hour class or two sections of a three-hour class each semester, and anything over six hours was considered an overload for which the instructor would be paid extra (Sutherland-Meier, personal communication). Implementation of the new format equalized the workload across the board so that all instructors, first- through fourth-semester, currently teach 12 hours over the course of the academic year. On occasion there was a shortage of instructors, in which case the department offered the option to teach

two five-hour classes as an overload for which the instructor was given extra pay (Sutherland-Meier, 1999).

From the very beginning of the implementation of the computer lab component in the first-semester curriculum, the Spanish department had to contend with a significant logistical challenge. During the design phase of the computer lab, the department had not envisioned a separation between sections whereby some had the computer component and some did not. The initial version of the computer lab was supposed to have 50 workstations but finally contained only 30, which meant that two class sections could not attend simultaneously (Kelm, personal communication; Sutherland-Meier). Because the computer lab could not accommodate the anticipated number of students, the department had to create sections of the first-semester course without the technology component. In retrospect, the department learned that the computer lab should not have been located in a general purpose classroom in a high traffic area of the Spanish building that became too small once the computer equipment was installed (Foerster, personal communication). The computer lab should have been built in a larger space that could accommodate 50 workstations.

Directly related to the logistical challenge of only 30 workstations in the computer lab was scheduling classes in the lab, which had to be staggered because only one class section could attend at time. All of the Computer-Assisted sections attended class with their instructor on Mondays; however, some sections had classroom instruction on Tuesdays and Thursdays and attended lab on Wednesdays and Fridays. Other sections attended class on Wednesdays and Fridays and participated in lab activities on Tuesdays and Thursdays. This

situation made it difficult to coordinate classroom instruction with lab attendance so that all of the Computer-Assisted sections covered the assigned course material and lab exercises on the same day of the week. Thus, what was covered in class was not tightly integrated with what occurred in the lab, because the same material was addressed on different days depending on which Computer-Assisted section the students attended (Foerster).

Another situation that presented an unanticipated challenge during the first phase of implementation was that the Computer-Assisted instructors were not required to attend the computer lab sessions with their students, because these two hours were not included in their total contact hours per week. Consequently, they did not necessarily know exactly what material was covered during lab or what questions and problems their students had. The instructors therefore often felt obliged to cover grammar and engage in grammar practice during class time since their students needed to be prepared for the final exam, which was the same for all first-semester sections—Computer-Assisted and Classroom-Only. The Spanish department realized that the course material covered during classroom instruction needed to be more closely integrated with the computer lab activities (Foerster). In order for the implementation of computer technology to be successful in foreign language instruction, Foerster (1996) states that creation of a course syllabus that integrates material covered in class with lab activities is essential. She further argues that computer technology must be an integral component of the program, which means that instructors must be fully aware of the content and objectives of the computer-assisted part of the curriculum.

Oral production is an important component of the first-semester curriculum, and learners usually have the desire and/or expectation to be able to speak Spanish (Foerster). It was difficult to provide enough oral production practice during the three days of class in addition to the other course material that needed to be covered (Foerster; Sutherland-Meier). The Computer-Assisted instructors frequently felt obligated to compact five days of teaching into three classes, which decreased time for communicative activities. Having just three days a week of classroom instruction was difficult because it resulted in less pair work, less instructor facilitation, and loss of interactive exercises and activities. The department decided that learners were not getting enough interaction in three days of classroom instruction and that the instructors needed an extra day of class time (Foerster; Sutherland-Meier).

The first phase of the implementation of computer technology in the first-semester Spanish curriculum provided the department with valuable experience from which to draw in order to improve the program and move forward. The problems of scheduling, coordinating and integrating classroom instruction with computer lab activities, and providing more time for interaction and oral production practice were challenges the department addressed in the first phase of technology implementation, and resolved as it progressed to the subsequent phase of implementation. The fall semester of 1999 represented the beginning of the next phase of the implementation of computer technology by the Spanish department.

In the fall of 1999, the structure of the first-semester Spanish course was changed from three days of classroom instruction and two days of lab to four days

of classroom instruction and one day of computer lab attendance for all students. The new format meant that every first-semester section included the computer lab component. The Spanish department decided that four days of classroom attendance was necessary to maintain the integrity of the program (Foerster), and that logistically it was not practical to have Classroom-Only versus Computer-Assisted sections. The department needed to allow all of the first-semester students to utilize the computer lab (Kelm). Under this format, experienced instructors taught two sections in the fall semester and one in the spring, which maintained the twelve hour teaching load over the academic year.

The new structure involved some changes to the course syllabus with respect to the graded oral production exercises that were recorded in the computer lab (Communicative Goals Recordings—CGRs), chapter exams, and the incorporation of a lab grade as part of the final course grade. The CGRs are still completed in the computer lab as part of the course syllabus for which learners receive a grade. The CGRs require learners to talk for 45-60 seconds about a picture that incorporates the grammar and vocabulary they are learning at a particular point in the semester. They may re-record their CGR until they are satisfied or until the time in which to complete the assignment expires. During the first phase of computer lab implementation the lower division coordinator discovered that many of the students were memorizing dialogues for their CGR and were using the **Pause** button instead of recording continuously (Foerster). Therefore, the format of the CGR was changed whereby learners practice in class with one picture, and then see a different picture for the graded CGR that incorporates the same grammar and vocabulary as the practice picture. Currently,

learners are still permitted to re-record until they are satisfied with their recording; however, they are forbidden to use the **Pause** button and will receive a "zero" on the assignment if they do so.

Another change the department made was the removal of chapter exams from the computer lab. Testing in the lab was difficult for some learners due to their typing ability and their ease in incorporating written accent marks. Incorporating the exam into the lab was also a challenging process. First, the course supervisor typed the test, then passed it to another person to convert it to electronic format to be presented to the students on the computer and to forward results to the instructor upon completion. This process created a "bottleneck" where one person wrote the test, another person converted the test to a digital file, and everything had to be given to support personnel to put it on the computer server.

A further issue with regard to taking tests in the lab was academic dishonesty (Kelm). For example, one might not know that the student taking the test was the person who should be taking it. It was also challenging to administer a test to multiple sections over two or three days. The learner who prepared for the test given on Wednesday had an advantage over the Tuesday group in terms of having more time to prepare. There was also the possibility that learners who had taken the test would communicate what was on it to those who had not yet taken the exam. Neither this issue nor that of academic dishonesty was ever resolved, so chapter exams are no longer administered in the lab. Controlling dishonesty was the primary reason exams were removed from the lab rather than technical issues, which could have been resolved more easily (Kelm).

The Spanish department implemented a lab grade as part of the final course grade, because it was discovered that when some learners finished daily assignments earlier than others, they then proceeded to "surf the Internet," rather than study, review, or practice further. These particular students did not perceive any value for lab attendance, and were not held accountable for spending time on activities not related to their Spanish course (Foerster). To address this situation, the department provided training for the teaching assistants who run the lab, and added a lab grade that is worth ten percent of the final course grade. Moreover, the lab grade was implemented as a motivation for learners to take the lab component seriously and to not waste time once they finished an assignment (Foerster). Currently, the teaching assistant provides a rather extensive list of activities to be done during lab attendance so learners who finish one assignment have several more exercises from which to choose and complete. There is a lab syllabus, and teaching assistants are responsible for monitoring the lab, getting to know their students, taking attendance, and assigning the lab grade. Five percent of the lab grade is comprised of weekly assignments that students submit to their teaching assistant, and the remaining five percent is the lab final that is taken from the material covered in the weekly assignments throughout the semester.

During the first phase of the implementation of computer technology by the Spanish department, the utilization of computers in second language teaching was still new enough that there were no corresponding computer lab exercises to accompany the course textbook. Therefore, the department had to create many of the lab activities, such as the oral questions practice and reading exercises and quizzes. The *Spanish Partner* program by McGraw-Hill Publishers was then

purchased for grammar exercises. Computer lab activities were coordinated as closely as possible with the textbook *Puntos de Partida*, fifth edition. By the end of the 1990s, the use of computer materials had become nearly commonplace, and computer software for second language learning was much more available because publishers were becoming more active in this area (Frommer, 1998).

The Spanish department currently has access to corresponding and ancillary materials for the first-semester curriculum that were not available during the first phase of implementation. This access facilitates coordination and integration of classroom instruction with computer lab activities. The first-semester course syllabus was simplified and streamlined so that materials include the textbook *Puntos de Partida* (sixth edition), the electronic workbook, the *Puntos de Partida Laboratory Manual*, and the *Puntos de Partida* CD-ROM that is accessed in the computer lab. Chapter 1 in the textbook corresponds with Chapter 1 in the lab manual. Lab activities focus on the lab manual, CD-ROM, and ancillary materials that accompany the textbook. Activities include listening comprehension practice, reading, grammar activities, and video scenarios with a story line, all of which are on the CD-ROM. Learners view the video and complete corresponding exercises. Databases are now available that contain hundreds of video clips of speech samples that have been transcribed and/or translated with corresponding vocabulary and grammar lists. The video clips have links to databases of related vocabulary and grammar. The Spanish department can coordinate grammar lessons with the video clips; for example, preterit versus imperfect usage can be seen on video where people tell a story about their first airplane trip. Students have the opportunity to see grammar use "in action" where

language is used in context, which has the potential of making the target language more real and meaningful to the learner.

Advantages of Computer-Enhanced Learning

The evolution from the first phase of computer technology implementation to the next presented the Spanish department with the opportunity to learn what worked well in the computer lab and what needed to change. The Spanish department's response to the aforementioned challenges resulted in the improvement and strengthening of its first-semester Spanish curriculum. In addition to these challenges, there were also several positive aspects to the implementation of the computer lab in the first-semester course. For example, a computer-enhanced environment offers rich input in terms of its ability to integrate multimedia, such as audio and video, and its ability to provide both implicit and explicit input in the form of various types of learning activities. In the computer lab, learners were exposed to both language forms and language in context. Learners could listen to Spanish speakers with a wide variety of accents and cadences from Peru, Mexico, Uruguay, Spain, and Argentina. They listened to those who speak slowly or quickly, and could use or not use a transcript or a translation as they listened.

Computer technology in language learning allows context to be integrated into the learning experience in a manner that corresponds with cognitive processes so that learners have immediate access to information that makes context meaningful (Frommer, 1998). Learners can simultaneously read printed words and expressions, hear the language spoken, and see language used in

context as an image or acted out, all of which provide the schemata necessary to understand and remember. Further, the computer can illustrate the dynamics of communication, such as timing and intonation (Frommer, 1998). Because computer technology has the capacity to provide access to many speaking styles, voices, and accents, it has the potential to provide a realistic look at the target culture that is not possible via the more conventional means of teachers speaking in the classroom (Bush, 1997).

The wide variety of exposure to classroom resources through technology and the World Wide Web was another positive aspect to implementing technology in second language instruction (Sutherland-Meier). Internet technology provides access to a wide variety of language learning options, resources, and learning environments for both learners and instructors (Blyth, 1999; Levy, 1997a). Learners can download language learning materials from archives or databases of digitized materials from websites worldwide (Levy, 1997a). Via Internet technology, learners now have more immediate access to native speakers and native cultures (Blyth, 1999), and both learners and teachers can engage in collaborative learning at a distance in environments that exist only in cyberspace (Levy, 1997a).

Independent learning and greater learner autonomy are also advantages associated with the use of technology in second language instruction. The computer lab is a student-centered environment that allows for individual flexibility, as opposed to a teacher-centered environment where students wait for their instructor to tell them what to do. A computer-assisted environment permits individualized learning in which learners can work at their own pace and can

review material as much or as little as they decide. The Computer-Assisted learners in the first-semester Spanish course could spend more time on the activities they liked or found especially useful. For example, some students really enjoyed the *Spanish Partner* drills while others preferred the listening activities. Sanaoui and Lapkin (1992) also found that technology encouraged the development of independent learning characteristics in high school French students involved in an email exchange project with native French speakers. These students assumed increased responsibility for their learning and broadened their cultural awareness.

Learners generally like completing computer-assisted grammar activities (Foerster; Blyth, 1999). According to Adolph and LeBlanc (1998), computer-based activities tend to work best when possibilities are finite and predictable. These researchers contend that, of all the skills taught, the computer lends itself to the development of grammar skills. Computer-assisted grammar exercises allow instructors to avoid grammar drills in class because the computer can give immediate feedback to students as they complete the exercises. Instructors can then direct more valuable class time towards communicative activities and spontaneous interaction (Adolph & LeBlanc, 1998).

The Spanish department found that students tended to like the *Spanish Partner* activities because they got immediate feedback (Foerster). Computer activities can provide immediate feedback that is implicit or explicit in nature. Explicit feedback may help learners to notice and attend to forms in the input that are different from those they produce, which may not always be possible with implicit feedback. Unlike a teacher, a computer does not grow tired of repetitive

drills or explanations. In addition, learners generally like participating in computer-based grammar activities better than traditional workbook exercises (cf. Nagata, 1998). Many computer-assisted grammar programs have the capacity to allow teachers to check if learners have done the work effectively (Adolph & LeBlanc, 1998). The technology in the Spanish department's computer lab made it easier for the Computer-Assisted learners to improve in areas that needed improvement. Subsequently, their instructors could check how long they worked with a program, how long they listened to the oral practice, and which *Spanish Partner* exercises they did or did not complete.

Computer technology can provide learners with valuable supplementary work and extra language practice, and offers the flexibility of providing language instruction when a teacher is not available, which also allows students to learn at their own pace (Levy, 1997a). In a computer-enhanced environment, learners can tailor tasks to their individual needs and interests, and study whatever they want for as long as they want in order to work on all aspects of the target language (Frommer, 1998). Computer programs permit students to decide how much help they need and when they need it, which is another way they take responsibility for their own learning (Frommer, 1998). Utilization of computer technology makes it possible to customize learning by varying the time spent on various elements of instruction (Bush, 1997). Specifically, learners can use functions that technology provides, such as the **Repeat** or **Replay** buttons to hear or see a particular phrase or passage as often as necessary in order to understand it. Bush believes that although this type of learner independence is not the ultimate contribution that technology-enhanced second language instruction will make in the future, it is a

pragmatic response to a very basic individual difference—the need for some learners to see or hear particular material more than others.

The utilization of computer technology in second language instruction provides the medium for computer-mediated communication (CMC), which has been found to be beneficial to learning. Kelm (1992, 1996), Warschauer (1996b), Sotillo (2000), and Patterson (2001) found that students felt more comfortable in electronic discussion than in face-to-face interaction. Participation in synchronous CMC (i.e., online chat using software such as Daedulus Interchange with a LAN connection) seems to be more balanced whereby all learners, not just the more vocal students or the instructor, tend to take part in the discussion (Warschauer, 2000, 1999; Warschauer & Meskill, 2000; Warschauer & Healey, 1998). Warschauer (2000; Warschauer & Healey, 1998) suggests that, because of the written nature of CMC, learner language tends to be more lexically and syntactically complex than in face-to-face discussion. Electronic and face-to-face discussion differ substantially; therefore, they should be used with different purposes in mind (Warschauer, 1996b). Some of the features of electronic discussion (longer turns, more equal opportunity for all students to express their ideas) indicate that it could be used effectively as a prelude to face-to-face discussion or as a supplement to oral production (Warschauer, 2000, 1996b; Warschauer & Healey, 1998). In addition to CMC via Daedelus Interchange, computer technology gives learners the opportunity to practice their language skills with native speakers online by engaging in email conversations (Blyth, 1999; Frommer, 1998). Several researchers (Beauvois, 1998; Cononelos & Oliva, 1993; Warschauer, 1996b) have found that the use of networked computers in

second language learning seems to have a positive influence on the development of linguistic skills with respect to improved written ability.

RESEARCH CONCLUSIONS RELATED TO THE CASE STUDY

The case study presented in this dissertation had two overall objectives. One objective was to present a historical perspective of the conditions for the development of the two iterations of the first-semester Spanish course, one that had a technology component and the other that did not. This research objective was addressed in Chapter 1, Introduction, and in the preceding section that discussed the evolution and growth of the first-semester Spanish curriculum to its current state. As an addendum to the historical perspective, the latter part of this section presents some possibilities for the future role of computer technology in instructed second language learning.

The other objective of the case study was to describe the learning that took place in the Computer-Assisted and Classroom-Only groups with respect to accurate oral and written verb production performance. The quantitative results and observations tend to indicate that participation in computer-assisted verb exercises in the first-semester Spanish classes had a positive effect on learners' ability to notice and focus attention on Spanish verb forms, thereby helping them to learn the forms, as shown by accurate oral and written production. The oral and written verb production performance of the two groups was similar at the end of the study with respect to accuracy, except for the discrete-item verb test on which the Computer-Assisted learners performed with statistically greater accuracy. While communication in a second language involves more than the ability to fill

in blanks with correctly conjugated verb forms, the ability to do so may play an important role in learners' subsequent ability to produce accurate grammatical structures in more creative language production (e.g., spontaneous conversation or written correspondence).

Quantitative findings also illustrated between-group differences with regard to learners' ability to use verb structures in oral production in terms of the frequency of self-initiated grammatical corrections. Specifically, the Computer-Assisted learners produced more self-corrections in their final oral interview. Quantitative analysis of the six sample transcriptions showed that the three Computer-Assisted learners tended to produce more silent pauses and more intra-utterance pauses, and fewer conversational fillers than the three Classroom-Only learners did.

The qualitative results and observations from the analysis of the six sample transcriptions showed perceived between-group differences in learners' oral production in terms of overall fluency with respect to conversational flow. Pause frequency and distribution reflect the specific features that distinguished the three Computer-Assisted learners' oral production from the three Classroom-Only learners′ speech. The speech of all three of the Computer-Assisted learners showed more hesitation phenomena in the form of a higher frequency of silent pauses and the distribution of those pauses, regardless of final oral interview score. Therefore, any perceived between-group differences in the overall fluency of these six learners with respect to conversational flow are not related to accurate oral verb production, but rather to their pause behavior.

The presence of pauses in speech production is not exclusively associated with a lack of fluency. Listeners accept pauses in their native language; however, not all pauses are completely acceptable. As discussed in Chapter 2, native speakers tend to pause at the beginning or end of an utterance; therefore, pause frequency and distribution may distinguish native speaker speech from that of non-native speakers, rather than the presence or absence of hesitation phenomena (Chambers, 1997; Riggenbach, 1991; Lennon, 1990). The three Classroom-Only learners exhibited pause behavior that was more similar to that of native speakers by using more conversational fillers (filled pauses) than silent pauses, which helped to maintain conversational flow. These Classroom-Only learners paused in more natural locations—at the beginning or end of an utterance—creating a more native-like distribution of pauses. Conversely, the three Computer-Assisted learners' pause behavior was not as native-like because they tended to use fewer conversational fillers. The conversational fillers they used were often accompanied by silent pauses that impeded, rather than helped, conversational flow. Although findings are limited to these six sample participants, they might indicate a general trend whereby the perceived between-group differences in the learners' oral production (apparent from listening to the final oral interview tapes and from anecdotal evidence given by the instructors) were related to learner pause behavior with respect to pause frequency and distribution.

Instruction that focuses on form may be beneficial and even necessary for some aspects of second language learning. While there is no doubt that a great deal of second language acquisition can take place without instruction that focuses on form, there are some language features that are difficult to acquire

through comprehensible input and meaningful interaction alone (Lightbown, 1998). Verb learning may be such a feature, a suggestion supported by the research of Metcalfe (1997) and Metcalfe *et al*. (1998). Metcalfe (1997) found that many second language students do not see any logic to verb endings, and believes that for many learners the main problem with learning verbs lies in their inability to see beyond the superficial appearance of what they read and write. Metcalfe's point is illustrated by one particular student who was asked why she had put **j'ai jouer* for the past tense instead of the correct *j'ai joué*. She replied, "I don't know...it's just a word..." (Metcalfe, 1997, p. 134). The viewpoint of many French students is, "French is not a language but a subject, a verb is just a word, and verb endings are often completely redundant" (Metcalfe et al., 1998, p. 19). It is conceivable that other second language learners, not just those who study French, have this attitude and find verb learning difficult.

Cognitive overload is often associated with second language verb learning (cf. Metcalfe et al., 1998) whereby learners are overwhelmed by the number of verb forms and tenses they must acquire and use, especially at higher levels of study. Learners in the present study were beginners who did not have to learn more than two tenses, and thus were not yet overwhelmed by the quantity of verb forms and endings that they must learn later. Study observations suggest that participation in computer-assisted verb exercises that focus on forms may have a positive effect on drawing learner attention to Spanish verb structures. Learner attention to and noticing of verb structures at the beginning level of second language learning may help them begin to organize their verb form knowledge. This behavior could lead to the establishment of a good foundation of verb form

knowledge on which to build at intermediate and advanced levels of study when there are many more verb structures and tenses to learn, manipulate, and use accurately. Utilization of computer-assisted verb activities in such a manner could help to alleviate the problem of cognitive overload and have a positive influence on the acquisition and accurate production of second language verb structures.

According to Garrett (1991), language learning entails some habit formation and Garrett believes that computer-based drills are ideal for establishing these habits. Nutta (1998) proposes computer-assisted exercises could be used for grammar instruction, leaving more class time for language use in meaning-focused exercises and communicative activities that use correct and appropriate grammatical structures in order to express meaning. Focus on form and focus on meaning are both important components of instructed second language acquisition. A focus on form may facilitate accuracy, while a focus on meaning may facilitate comprehension of a target language message and fluency with respect to conversational flow.

The decision made by the Spanish department to change the structure of the first-semester Spanish course from three days of classroom instruction to four was not based upon any of the observations the present case study makes. Quantitative and qualitative study findings do, however, tend to correspond with the department's perception that three days of classroom interaction were not enough, and with the change in format to four days of classroom instruction and one day of lab attendance. Quantitative results did not show any statistically significant differences in accurate oral and written verb production performance between the Computer-Assisted and the Classroom-Only learners at the end of the

study, except on the already discussed discrete-item verb test. A lack of significant differences implies a lack of a statistically significant effect, but does not imply a negative effect for the computer-assisted verb exercises. The Computer-Assisted learners demonstrated the ability to produce oral and written verb forms as accurately as the Classroom-Only learners.

In regard to qualitative findings, the present study observed between-group differences in the learners' oral production that were apparent in the taped final oral interviews, prompting the transcription analysis of the speech of six sample participants. The three Computer-Assisted learners whose speech was transcribed suggested that they had acquired second language knowledge by producing responses in the final oral interview that were as morphologically accurate and content-appropriate as the three Classroom-Only learners' responses. Therefore, it is possible that the perceived between-group differences in the learners' oral production were not related to accuracy with respect to verb morphology, but rather to learner pause behavior. This study suggests that the three Computer-Assisted learners' production of more hesitation phenomena may have been due to two fewer days of classroom interaction per week and, thus, fewer opportunities for communicative activities than the Classroom-Only learners had during five days of classroom instruction. As previously stated, generalizations cannot be made based on the pause behavior transcribed from the speech of only six learners; however, it may be that their pause behavior indicates a general trend for the other study participants as a group (N = 104). The present results cannot state with any certainty that there was a general trend in learner pause behavior such that the Computer-Assisted learners (N = 50) paused more

often and had a higher distribution of intra-clausal pauses in comparison to the Classroom-Only learners (N = 54). Nonetheless, the findings support the department's decision to change the format of the first-semester course to include only one day of lab attendance.

The future role of the computer lab in second language instruction should be to continue to help teachers and learners use technology effectively (Scinicariello, 1997). The fear that technology-enhanced language instruction will replace teachers has turned out not to be the case. Rather, the reverse is true because teaching with technology is demanding of personnel; machines and networks require technical support whereas books and chalkboards function for years without it (Scinicariello, 1997). Bush (1997) further suggests that instructors are able to do things that technology will not be able to do for the foreseeable future, such as facilitate spontaneous oral communication. Thus, language instructors should not be afraid to allow technology to take over some of the tasks and activities involved in second language teaching.

Future implementation of computer technology by the Spanish department at the University of Texas at Austin looks promising. The Spanish department is being restructured into new buildings, and will have two new computer labs, each with 50 workstations. The new computer labs will give the department the capacity to incorporate the computer component in its first- through fourth-semester curriculum, and possibly beyond. The lower-division program will have the ability to accommodate all students in the computer lab. Thus, future implementation of computer technology will involve decisions by the Spanish department on how to utilize the two new labs for courses beyond the first-

semester curriculum. The utilization of computer technology via Daedelus Interchange for computer-mediated communication (CMC) in its fourth-semester curriculum, for example, has been beneficial to the learners (Kelm). With two 50-workstation computer labs, it will be possible for students at earlier levels of study to participate in CMC.

Future Applications of Computer-Assisted Instruction

The evolution of the implementation of computer technology by the Spanish department at the University of Texas at Austin described in this case study was presented with the hope that it may provide insight that will assist researchers, developers, and university administrators, faculty and staff who are in the process of implementing computer technology in their language programs so they might not encounter the same challenges this program did, but rather similar successes. The present study makes some observations with respect to course logistics and the integration of computer activities with classroom instruction that may be of importance to administrators and faculty as they develop computer-enhanced second language course curriculum. Study observations further indicate that the utilization of the computer lab was a good division of labor for some second language learning tasks; however, the computer lab should serve as a complement to classroom instruction rather than a replacement for it.

In regard to course logistics, the study observed it is essential to make certain that if a computer lab facility is built, the space can accommodate the anticipated number of learners once the workstations are installed. Perhaps this observation seems obvious; however, equipment requires space and the lack of

space at the University of Texas at Austin to accommodate the requisite number of learners had a direct effect in 1996 on creating two iterations of the same first-semester Spanish curriculum and thus two different methodologies. This division was not the original intention of the Spanish department during the design phase.

Another observation the case study makes with respect to course logistics is that classroom and computer lab activities should be tightly integrated. Study findings suggest the need to balance classroom instruction with computer lab attendance in a manner that integrates computer activities with a communicative syllabus in order to benefit both accuracy and fluency. The integration of course material and computer lab activities further suggests that instructors should know what occurs with the learners during the lab sessions. Instructors should not feel obligated to teach grammar that has been covered in the lab via participation in computer-assisted grammar exercises. Perhaps the instructors occasionally could attend the lab with their students or undergo training at the beginning of the semester that demonstrates the material to be covered during lab attendance. Computer technology cannot, and should not, replace classroom instruction and interaction. Rather, the use of computer technology should be integrated with classroom instruction and a communicative syllabus.

Study observations indicate that using computer technology for some of the tasks involved in second language learning is a good division of labor, with the caveat that we recognize the technology's strengths and limitations, and that we do not expect computers to accomplish anything an instructor is able to do. For example, a computer environment offers rich input via multimedia that exposes learners to video images with audio of language in action. Additionally,

computer-assisted grammar activities provide immediate feedback and opportunities for individualized learning whereby learners can complete exercises at their own pace.

Computer technology is not designed to replace completely any of the other media used in second language teaching (e.g., textbook, classroom interaction), nor is it meant to be added as an unstructured supplementary means of learning (Bickes & Scott, 1989). Replacing classroom instruction with computer lab attendance could have a negative effect on learner fluency in terms of conversational flow. The present study observations suggest that the use of computer technology was helpful for learning Spanish verb forms and for exposure to target language input. Using it in place of classroom time and interaction with other speakers (even non-native speaker classmates), however, may have contributed to the Computer-Assisted learners' speech as less fluent, according to our pause criteria. Therefore, using the computer lab as a replacement for classroom interaction where learners attended lab two days per week during the first phase of implementation was not a good division of labor. Language learning does not exist in a vacuum; it necessitates practice and use. Successful language learning and production require the opportunity to communicate in the target language whether in writing, speaking, listening, or reading. Utilization of computer technology does not represent a fully autonomous alternative to language exposure through human contact (Blake, 1998).

The use of computer technology in instructed second language learning requires distinguishing between language learning activities in which technology

can help accomplish essential goals, and other learning activities in which classroom methods are more appropriate and perhaps better (Blake, 1998). The computer mode is not designed for spontaneous conversation or open-ended dialogue, therefore, this type of oral production would be better omitted from computer-assisted activities until the computer can truly simulate authentic conversation, which is not likely to happen for a long time. Blake (1998) further contends that the computer will never achieve the type of communicative competence that human beings achieve.

Although there are computer applications that use speech technology for teaching pronunciation, reading, and listening (Ehsani & Knodt, 1998), they are not able to engage in spontaneous conversation. Ehsani and Knodt contend that most voice-interactive computer-assisted language programs are used to teach and evaluate linguistic features of the language (i.e., pronunciation, vocabulary, grammatical structure) by design, because such formal features can be clearly identified and integrated into a focused task. They further point out that computer technology can automate the learning of these aspects of language, thereby making valuable class time available that would otherwise be spent on drills. Bailin (1988) argues that the field requires far more understanding of exactly what knowledge is needed to learn a language and, until that information is available, computer programs that replicate the human language acquisition process will be unattainable. Bailin's point seems as applicable today as it was over ten years ago.

Second language educators should be mindful of the manner in which they implement technology in the foreign language classroom. Computer activities may be effective for learning grammatical structures like verbs but, as the present

findings suggest, there also must be ample opportunity for oral production and human interaction in the classroom or aspects such as learner fluency could be adversely affected. Simply purchasing expensive and elaborate systems will probably lead to disappointment with use of the computer (Warschauer & Meskill, 2000; Warschauer, 1996a). Warschauer (1996a) proposes that implementation and use of computer technology in the service of good pedagogy would more likely lead to success by integrating computer activities into a communicative syllabus as a supplement to class time. Warschauer suggests this practice will lead to the enrichment of educational programs and learning opportunities for our second language learners. Computer technology in second language instruction has been the most successful when used as a support for existing curriculum (Swann, 1990).

Computer technology has become almost ubiquitous in educational settings, which has an effect on the way one reads, writes, and communicates with others (Kern, 1998). According to Kern, language educators must strive to understand the nature of new technologies in order to make informed decisions with regard to which uses of technology will best serve their goals. Further, they must base decisions to implement technology on thorough knowledge of their instructional needs and on an understanding of the capabilities and limitations of the available technologies (Kern, 1998). Adolph and LeBlanc (1998) state that educators must be willing to exploit technology when it serves the learner and must resist administrative initiatives that are more concerned with budgets than learning. Implementation of computer technology in second language instruction should be based on sound pedagogy, not on budget constraints that consider it a

way to replace classroom instruction. In order to determine how best to implement technology, the administration and the faculty should work together. The administration should know the goals and methods of language teaching in order to avoid the assumption that the implementation and utilization of technology equals the reduction of teaching staff (Adolph & LeBlanc, 1998). Adolph and LeBlanc (1998) believe it is equally important that the faculty listen to and respect the constraints put on the administration by governing boards and legislatures. Language departments should take budget concerns into account with the realization that administrators are constrained by their funding.

LIMITATIONS AND FUTURE RESEARCH

A case study by nature has a narrow scope that is limited to its particular participants and study experience. The limitations of the present case study, therefore, pertain to between-group differences and to the narrow scope of the study. The learning environment with its pursuant methodology, either computer-enhanced with classroom instruction or classroom-only instruction, is probably the most apparent between-group difference that was not controlled. Additionally, there were between-group differences with respect to previous Spanish study and travel experience. The majority of the Computer-Assisted learners had studied Spanish in high school while the majority of Classroom-Only learners were true beginners who had not taken Spanish at the secondary level. Ideally, none of the participants would have had prior Spanish language study. There were also different degrees of travel experience in which some of the learners had traveled to a Spanish-speaking country. Although none of the participants who had

traveled to a Spanish-speaking country spent enough time there to acquire a significant amount of language knowledge that would give them an unfair advantage, it would have been desirable for all participants to have the same amount of travel experience.

The present case study acknowledges the aforementioned between-group differences that limit study findings to these learners. Knowing what these variables are, future research can better attempt to isolate, control, and operationalize learner variables so that there are few, if any, between-group differences. Consequently, one could conduct a study with an experimental design whose results would be generalizable beyond the subject population of the study.

The scope of the present case study was limited with respect to the type of oral production considered and the small number of transcriptions that were analyzed for learner pause behavior. The present investigation only considered oral data from the picture description (pretest) and the final oral interview (posttest). The findings from the final interview itself were also limited, in that all participants did not follow the same oral interview format. The Computer-Assisted learners described their daily routine and the Classroom-Only learners described a picture with actions. Future research should include a broader view of oral production by comparing, for example, learner speech excerpted from in-class dialogues with that from graded interviews or picture descriptions. Such research should also endeavor to control the aforementioned learner and study variables.

The context of the oral production that was analyzed for accuracy also narrowed the scope of the present study. The study considered the speech of

learners in a formal educational setting who probably did not continue to use the target language once they stepped out of the classroom context. Learners who study abroad, however, continue to be exposed to target language input outside of the classroom environment. Study abroad learners may exhibit speech that is different from that of learners who study only in the context of a university course curriculum. Exposure to language via studying and living abroad may influence learners to use verbs, endings, and tenses that vary from those usually taught in the classroom context. For example, study abroad learners may use verbs that are semantically equal to those taught in the classroom but are easier to conjugate, because native speakers in the host country use such forms more often. Thus, they are more frequent in the input to which the learners are exposed. The speech of study abroad learners might be different, but no less accurate, than the speech of learners in a typical university second language program. Future research should consider and address how the context of studying and living abroad may influence or change our perception and analysis of accuracy.

The scope of the present study was limited with respect to its ability to make suggestions via learner reactions regarding the possibility of negative affect from participating in the computer-assisted verb exercises. Foerster reported anecdotal evidence that learners generally liked completing the grammar-based exercises, but they did not feel comfortable with using accent marks when writing their compositions or when completing the written portions of the chapter exams. While anecdotal comments suggest the possibility for negative affect, they are by nature a limitation. The Computer-Assisted learners were not asked directly whether they liked participating in the computer-assisted verb exercises. Although

neither the learners nor the instructors who participated in the study reported a negative affect from participation in the computer-assisted activities, the potential for it exists. It is possible that if there were any negative affect, it could have been a byproduct of the functionality associated with the computer mode (e.g., writing compositions or taking tests on the computer). In order to ascertain the presence of negative affect associated with participation in computer-assisted activities, future research should collect data directly from the learners through think-aloud protocols whereby learners are recorded as they participate in various computer activities. Think-aloud protocols would provide learners' reactions as they simultaneously complete computer activities in order to better determine which exercises garner a positive learner response and which may lead to negative affect.

The present study did not take into account the amount of time learners in both the Computer-Assisted and Classroom-Only groups spent on the various coursework activities. Thus, it cannot be determined with any certainty exactly how much class time was devoted to interactive exercises for either the Computer-Assisted or Classroom-Only learners. Study findings suggest the Computer-Assisted learners' speech had more hesitation phenomena because they spent less time involved in classroom interaction. The study acknowledges that generalizations cannot be made based upon the speech of six learners and that not taking time on task into account is another limitation with respect to the study's narrow scope. Future research should address this limitation by collecting and analyzing data on how much time learners are engaged in both activities conducted in the classroom and exercises completed in the computer lab to

determine whether time on task has any influence on learners' oral language production in terms of hesitation phenomena.

The current first-semester Spanish language program at the University of Texas at Austin requires all learners to attend the computer lab one day a week and classroom instruction the other four days. The fact that there are no longer any Classroom-Only sections eliminates the learning environment as a between-group difference that is also a study limitation. Future research could then investigate learners' pause behavior via a study whose scope is broader than that of the present investigation. The study should include a quantitative and qualitative analysis of learner fluency that considers and transcribes the speech of a larger group of learners, and in which the criteria for transcription are not based upon high, mean, and low scores on a particular test measure. Rather, any high and low scores would be excluded so that the remaining middle or mean scores comprise the data for transcription. The study also could include native speaker reaction to learner pause behavior to determine what types of pauses are acceptable or more tolerable than others.

The quantity of verb inflections to be learned in the first two years of typical university level language study can be overwhelming. Thus, another direction for future research would be to investigate the use of computer-assisted verb activities by learners at different levels of study. Ideally, the same learner population would complete computer-based verb exercises from beginning to more advanced levels of second language study in order to determine if the computer exercises help these learners master the large volume of verb forms and tenses they are responsible for knowing and using by the end of their fourth

semester of study. Perhaps utilizing computer technology as a means of delivering grammar instruction at the beginning level of language study would establish a solid foundation of verb knowledge on which to build at intermediate and advanced levels. Continued implementation of computer technology at intermediate and advanced levels of study could reinforce that foundation and further enhance it. Utilizing computer technology in this manner could help alleviate the confusion and cognitive overload second language learners often experience by their fourth semester, at which point they are expected to know not only a greater quantity of verb forms, but also to know and accurately use many more verb tenses.

If future research continues to support the implementation of computer technology as beneficial to second language learning, then its use could be an important complement to communicatively-oriented instructed second language acquisition. Computer technology could be used for presentation, explanation, and application of grammatical structures, which would then allow for the dedication of more classroom time to communicative interaction that focuses on meaning. It could facilitate the appropriate use of grammatical structures to express meaning accurately and fluently. Because classroom instruction is limited by time constraints, implementation and utilization of computer technology in this manner would facilitate the devotion of more class time to the integration of form with meaning and function, all of which are essential to successful communication. The present findings and observations suggest that computer-assisted verb exercises have a positive effect on learning Spanish verb structures. Future research should continue to investigate how the implementation and utilization of

computer technology will be the most effective and beneficial for second language learners.

Appendix A: Discrete-Item Verb Test

Name:

Instructor:

Class Time:

Discrete-Item Verb Test

Fill in the blank with the correct present tense form of the verb in parentheses for the subject indicated. If you are not sure of a verb form, skip that item and come back to it later, or leave it blank. You have five minutes to complete this exercise.

1. Tú _____ (escribir) los ejercicios en español.
2. Nosotros _____ (comer) a la una todos los días.
3. Los estudiantes _____ (levantarse) muy tarde los fines de semana.
4. Tú _____ (ser) de México.
5. Juan no _____ (poder) hablar ruso.
6. Tú nunca _____ (oír) el ruido de los vecinos.
7. Marta _____ (ver) la televisión por la tarde.
8. Los niños _____ (estar) enfermos hoy.
9. Nosotros _____ (recibir) buenas notas en la clase de español.
10. Miguel _____ (cantar) muy mal.
11. Nosotros _____ (ir) de compras esta tarde.
12. Ustedes _____ (tener) mucha tarea.
13. Yo siempre _____ (traer) los libros a la clase.

14. Nosotros _____ (divertirse) en las fiestas.

15. Yo _____ (poner) los platos en la mesa.

16. Tú siempre _____ (pedir) los tacos en un restaurante mexicano.

17. Yo no _____ (conocer) al Presidente Clinton.

18. Lola _____ (practicar) deportes.

19. Los niños _____ (sentarse) en el suelo.

20. Yo no _____ (saber) la respuesta.

Appendix B: Computer-Assisted Learner Background Questionnaire

Name:

Instructor:

Class Time:

Native language:

Language spoken at home:

Years of High School Spanish:

Family member(s) who speak Spanish:

Have you ever studied another foreign language? If yes, which one(s), when, and for how long?

Have you ever studied in another country? If yes, when, where, and for how long?

Have you ever traveled to/in another country? If yes, when, where, and for how long?

Why are you taking Spanish, as opposed to German, French, Italian, Japanese, etc.?

How much computer experience have you had?

How have you used the computer in the past and present (i.e. word processing, game playing, e-mail, internet)?

How do you rate your typing skills (excellent, good, average, poor)?

Appendix C: Classroom-Only Learner Background Questionnaire

Name:

Instructor:

Class Time:

Native language:

Language spoken at home:

Years of High School Spanish:

Family member(s) who speak Spanish:

Have you ever studied another foreign language? If yes, which one(s), when, and for how long?

Have you ever studied in another country? If yes, when, where, and for how long?

Have you ever traveled to/in another country? If yes, when, where, and for how long?

Why are you taking Spanish, as opposed to German, French, Italian, Japanese, etc.?

Appendix D: In-Class Composition

Write a letter home to your mother in which you tell her about the University of Texas. Your letter should be at least 100 words in length. Begin the letter with "Querida Mamá".

Appendix E: Computer-Assisted Learner Final Oral Interview

I. Warm-up Questions

1. ¿Cómo estás?

   'How are you?'

2. ¿Cuántos años tienes?

   'How old are you?'

3. ¿De dónde eres?

   'Where are you from?'

4. ¿Dónde vives?

   'Where do you live?'

5. ¿Cuántos hermanos tienes?

   'How many brothers and sisters do you have?'

II. Personal Questions

Question 1 (reflexives):

Describe tu rutina diaria durante la semana / los sábados / el verano.

'Describe your daily routine during the week / on Saturdays / during the summer.'

Question 2 (past):

¿Qué hiciste durante las vacaciones de primavera / el verano pasado / las vacaciones en diciembre?

'What did you do last spring break / last summer vacation / last December break?'

III. Situation with a partner; instructor chooses one of the following:

1. Planning a trip to Spain or Mexico
2. An end-of-semester party
3. Finding a new roommate and new apartment

Appendix F: Classroom-Only Learner Final Oral Interview

I. Warm-up Questions

1. ¿Cómo estás?

   'How are you?'

2. ¿Tienes muchos exámenes?

   'Do you have many exams?'

3. ¿Qué vas a hacer durante el descanso del invierno?

   'What are you going to do during the winter break?'

4. ¿Tienes una familia grande?

   'Do you have a big family?'

II. Description of a picture; instructor chooses one of the following:

1. Scene in an airport (from *Puntos de partida*, p. 221)
2. Scene in a restaurant (from *Supplementary materials to accompany Puntos de partida*, p. 98)

III. Personal Questions; instructor chooses one of the following:

1. ¿Qué hiciste el invierno pasado?

   'What did you do last winter?'

2. ¿Qué comiste ayer?

   'What did you eat yesterday?'

3. ¿Qué hiciste la última vez que fuiste de vacaciones?

   'What did you do the last time you went on vacation?'

IV. Situation with the instructor; instructor chooses one of the following:

1. You have just inherited $5,000 from your long lost aunt, Gertie, and you plan to travel to 2 or 3 Spanish-speaking countries for a vacation. Explain to the travel agent the details of your trip.

   Instructor cue: Buenas tardes. ¿Cómo puedo servirle?

   'Good afternoon. How can I help you?'

2. You are preparing to have a fiesta for your Spanish class to celebrate the "A" that you received in the course. You have decided that you will have a traditional Spanish meal catered. You want to have appetizers, desserts and fruits prepared just like in the cookbook you bought, Tapas, vinos y postres españoles. Discuss the plans for your fiesta with the owner of El rey de la cocina (an Austin caterer).

   Instructor cue: Buenas tardes. ¿Cómo puedo servirle?

   'Good afternoon. How can I help you?'

3. You have been accepted in a study abroad program in Columbia. You are being interviewed by the director who needs personal information so she/he can place you with a Colombian host family for the semester. She/he wants to know all about you.

   Instructor cue: Buenas tardes. Entiendo que Ud. es de Texas.

   'Good afternoon. I understand that you are from Texas.'

Appendix G: Final Exam Composition

El programa de Costa Rica. Your family will be hosting a Costa Rican student in the Spring before you leave on your trip for Latin America. You figure this might be another great opportunity to learn about one of the places you might like to visit. Since you are the only person who speaks Spanish in your family, your parents have asked you to write a letter to the director of the program to give him the following information. (Make sure your letter is at least 120 words long and that you include at least 3 command forms in it. **UNDERLINE the command forms!)**

- Greet the director and introduce yourself and your family.
- Since the exchange student is coming from January to May, tell the director what kind of weather to expect and what kind of clothing the student needs to bring.
- Compare Austin to other cities in Texas.
- Then tell him that you have studied Spanish this year and that you are going to help the student in Austin.
- Describe some of the forms of entertainment in the Austin area.
- Tell what interesting things you did this year.
- Tell him to write back with any questions he might have.

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Vita

Catherine Elizabeth Buscemi was born in Fort Knox, Kentucky, the daughter of Dolores Foster Buscemi and Jon Buscemi. After graduating from Cherry Creek High School, Englewood, Colorado, in 1982, she entered Colorado State University in Fort Collins, Colorado. She received the degree of Bachelor of Science in Psychology, second major Spanish, in May of 1987. She worked as an Account Administrator for a brokerage firm then began graduate school at Texas Tech University in August 1989, where she also taught Spanish as a Teaching Assistant. In May 1992, she was awarded the degree of Master of Arts in Spanish Language and Literature. She then began graduate school at The University of Texas at Austin in August 1992, received an Assistant Instructorship to teach Spanish, and continued studies in Romance Linguistics with a major emphasis on Second Language Acquisition.

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